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THE EFFECTIVENESS OF VIDEO SELF-MODELING (VSM) AS A FLUENCY MAINTENANCE STRATEGY FOR ADULTS AND ADOLESCENTS WHO STUTTER

by

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©

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Abstract

A mixed design was used to study the effect of video-self modeling (VSM) on the fluency maintenance, self-efficacy, and affective and cognitive reactions to stuttering of clients who had recently completed an intensive stuttering program. Eleven clients were randomly assigned to either a VSM group or a control group. VSM group members were instructed to watch self-modeling samples over a six-month period. Self-modeling DVDs were created from post-treatment speech samples and edited to remove moments of stuttering. Speech samples were obtained immediately post treatment and every second month and analyzed for percent syllables stuttered and syllables per minute. Post-treatment and six-month follow-up measures of self-efficacy and affective and cognitive variables were also collected. The VSM group demonstrated a significantly higher level of fluency at the end of six-months. However, as a result of existing group differences prior to the introduction of VSM, no conclusions could be drawn about its effectiveness.

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THE EFFECTIVENESS OF VIDEO SELF-MODELING (VSM) AS A FLUENCY MAINTENANCE STRATEGY FOR ADULTS AND ADOLESCENTS WHO STUTTER

Introduction

Maintenance of fluency following successful stuttering treatment has been an area of long-standing concern. It is well known amongst clinicians, and it has been consistently shown in the literature that a substantial proportion of clients who have undergone successful treatment experience relapse (Boberg & Kully, 1994; Craig & Calver, 1991).

Relapse in stuttering treatment is not an issue that would surprise most clinicians. As discussed in Craig (1998), treatment of stuttering is similar to the treatment of other conditions such as those requiring exercise regimens, addictive disorders, and anxiety disorders in that: (a) they all involve behavioral change and (b) cycles may occur after successful treatment that cause "swings between success, lapse, and relapse" (p.23). It is thus important to recognize that stuttering treatment, as in the treatment of other disorders focused on behavioral change, includes the real possibility of relapse for many clients. At the same time, it is crucial for clinicians and researchers to identify more effective methods that can prevent relapse and hence facilitate maintenance after initial therapy (Craig, 1998).

Toward that end, the current study seeks to investigate the effectiveness of one specific approach to the facilitation of fluency maintenance - video self-modeling (VSM). Video self-modeling has been shown to be effective in the remediation of a variety of

behaviors, and preliminary studies have demonstrated its potential benefit in the reduction of stuttering and maintenance of fluency.

Literature Review

Stuttering is a disorder for which there presently is no cure. However, treatment is currently available that can help stutterers communicate more easily and effectively. Many people who go through speech therapy achieve a level of fluency that enables them to participate more easily and effectively in previously challenging communicative contexts. Unfortunately, the success that some clients achieve is short-lived and many return to their previous level of speech difficulty. While several therapy programs provide clients with strategies to maintain fluency gains after treatment, these methods have not been rigorously investigated, and, as is evident by the significant number of clients who relapse, do not meet the needs of those seeking to maintain their progress in therapy.

For this reason, clinicians and researchers must recognize the need to make improvements in existing forms of fluency maintenance and investigate new methods. An abundance of research exists that points to VSM as a strategy that is worthy of investigation. Its demonstrated effectiveness in alleviating numerous problem behaviours, along with preliminary studies that have suggested its potential application to stuttering treatment calls for researchers and clinicians to seek a better understanding of why this strategy is effective and to investigate whether it can contribute to fluency maintenance.

This review is divided into five major areas. First, the reader will be provided with a description of the problem of stuttering and general approaches that are currently used in its management. The second section will review the problematic issue of relapse

after successful therapy. This will include a discussion of current methods used to maintain fluency gains as well as client-specific factors that may be related post-treatment relapse. The third section will introduce video self modeling (VSM), the method of behaviour change that this study will examine. The fourth section will discuss the use of VSM with other problem behaviours. It will begin with a review of the literature on VSM and its effect on various problem behaviours and associated affective, behavioural, and cognitive states. Some of the practical advantages of VSM will then be presented, followed by a discussion of possible reasons for the effectiveness of VSM. The section will end by discussing maintenance of behaviour change following VSM intervention. The final section of this review will present prior research that has addressed VSM in the treatment of stuttering. It will conclude by considering the potential of VSM for facilitation of fluency maintenance.

The Problem of Stuttering

Stuttering is a speech disorder that is "characterized by an abnormally high frequency and/or duration of stoppages in the forward flow of speech. These stoppages usually take the form of: (i) repetitions of sounds, syllables, or one-syllable words (ii) prolongation of sounds, or (iii) 'blocks' of airflow or voicing in speech" (Guitar, 2006, p.13).

In addition to the core stuttering behaviours, people who stutter may develop negative affective, cognitive, and behavioural reactions to their stuttering (Bloodstein, 1995; Yaruss & Quesal, 2004), which in turn, can influence their speech (Bloodstein, 1995; Guitar, 2006; Yaruss, 1998). Negative affective reactions can include embarrassment, fear, anxiety, shame and other negative feelings stutterers may have

about their speech. Negative behavioral reactions can include avoiding words and speaking situations as well as other behaviors such as physical tension, movements and extraneous words. Negative cognitive reactions to stuttering can include negative self-evaluation and decreased self-esteem (Yaruss & Quesal, 2004). All of these personal reactions to stuttering "influence not only the speaker's fluency in a given situation, but also the overall experience of the stuttering disorder"(Yaruss & Quesal, 2004, p. 47).

The core stuttering behaviours, as well as the associated affective, cognitive, and behavioural reactions to stuttering form the major components of advanced stuttering. Treating all of these components has been a major focus of several therapy programs (Boberg & Kully, 1994; Craig, Feyer, & Andrews, 1987; Gregory, 2003; Langevin & Boberg, 1993; Langevin & Kully, 2003).

Approaches to Treating Stuttering

A number of methods for treating stuttering have been described in the literature. These methods may be broadly characterized into three general approaches, (a) fluency shaping, (b) stuttering modification, and (c) integrated approaches (Guitar, 2006; Peters & Guitar, 1991).

In the *fluency shaping* approach the goal is to replace stuttering with fluent speech. Initially, this is accomplished by training the client to use several methods that help establish fluent, yet very controlled speech. Examples of such methods include speaking at a considerably slow rate, relaxed breathing, phrase continuity, and gentle onset of phonation. These methods, or fluency skills, are then modified so that the client's speech is less controlled-sounding and more natural. Once fluency is established in the clinic, clients gradually vary the environments in which they use their newly

learned fluency skills until they are successful at using these in their typical speaking environments (Guitar, 2006).

In the *stuttering modification* approach, the goal is not for clients to speak more fluently, but rather to stutter more easily. That is, to stutter in a more relaxed and easy manner, with as little effort as possible. In therapy, clients learn about, and become acutely aware of their own stuttering behaviour, after which they learn to modify it so that it becomes more fluent, or less abnormal. Therapy also focuses on the acceptance of stuttering, and reducing negative feelings and avoidances (Guitar, 2006).

Integrated approaches use a combination of fluency shaping and stuttering modification approaches. Like the stuttering modification approach, clients learn to stutter more easily, accept their stuttering, and deal better with negative attitudes, feelings and beliefs associated with stuttering. In combination with this, clients learn fluency-enhancing skills that are typically used in fluency shaping programs, which improve the fluency of their overall speech (Guitar, 2006).

Programs that have been shown to yield the most successful outcomes in treatment of advanced stuttering are those that use prolonged speech (i.e., speaking at a relatively slow rate, prolonging the vowels) with a variety of other strategies. These strategies include an intense initial phase of treatment, specific transfer activities, self-evaluation of speech, self-management skills, and a focus on speech naturalness and feedback. A maintenance program that actively addresses the actual stuttering behaviour along with self-evaluation, self-management, and speech naturalness is a vital component of these stuttering therapies. In addition, performance contingent clinical visits during the

maintenance phase have been shown to enhance the effectiveness of these stuttering programs (Bothe, Davidow, Bramlett, & Ingham, 2006; Ingham, 1980).

Relapse after Successful Stuttering Therapy

Although treatment for stuttering has been shown to be effective, various studies that have reported success in stuttering treatment have also emphasized concern about the significant number of clients who relapse. Follow up studies suggest that as many as 30% of clients demonstrate relapse (Craig, Feyer, & Andrews 1987).

In one study, Boberg & Kully (1994) examined the fluency maintenance of 42 participants of an intensive stuttering treatment program. At immediate post-treatment, all clients had a reduction in stuttering, with 90% experiencing dramatic success. Follow-up data were collected 2 or 3 times during a period of 12 to 24-months. Using a stuttering frequency rate of 3% or less for satisfactory maintenance, between 3-6% as marginally satisfactory, and 7% or above as unsatisfactory, the authors reported that while 76% of the clients maintained satisfactory to marginally satisfactory gains, 24% experienced relapse.

In another study, Langevin, Huinck, Kully, Peters, Lomheim, and Tellers (2006) examined the effectiveness of an intensive stuttering treatment program 2 years post-treatment within and across client groups from Canada and the Netherlands. Results indicated that both groups experienced substantial reductions in stuttering at post treatment and at the 2-year follow up. Clients were considered to have maintained clinically meaningful speech gains, if they maintained: (a) at least 50% reduction in stuttering frequency at the final follow up relative to their pre %SS and (b) a final follow up stuttering frequency rate that was equal to or less than their post %SS plus 3% (i.e. 3%

regression permitted). Based on these criteria it was found that 29% of the Dutch group and 14% of the Canadian group demonstrated relapse at the two-year follow up.

Several other studies have reported similar results after successful stuttering therapy (Craig & Calver, 1991; Hancock, Craig, McCready, McCaul, Costello, Campbell, & Gilmore, 1998; Howie, Tanner, & Andrews, 1981; Langevin & Boberg, 1993; St Louis & Westbrook, 1987).

Relapse Prevention

Several methods of maintaining fluency after stuttering treatment have been proposed, but only a few have been tested (Craig, 1998; Finn, 2003). Methods that have shown some promise in the maintenance of fluency primarily involve those that focus on self-control and the self-management of skills learned in therapy (Craig, 1998). Other approaches that have been investigated include cognitive behavioral therapy and construct therapy. Studies have provided some support for the efficaciousness of these methods. However, most have been preliminary in nature and almost all have involved only a few subjects in single-subject designs (Craig, 1998).

As well, the effectiveness of anti-relapse methods may be influenced by various client-specific factors. These may include pre-treatment percent syllables stuttered (%SS), avoidance behaviours, reaction to stuttering, locus of control, self-efficacy, trait anxiety, self-discipline, perceptions of speech naturalness, possible underlying neurophysiologic deficits, and the ability to perceive oneself in a fluent speaker role (Boberg & Kully, 1994; Craig, 1998; DiLollo, Manning, & Neimeyer, 2003).

In his review of relapse following treatment of stuttering, Craig (1998) concluded that there appears to be no single factor that is predictive of post-treatment relapse. Of

various factors which have been examined, only percent syllables stuttered (%SS) has consistently been found to be related to post-treatment relapse in that higher pre-treatment %SS scores are associated with poorer performance immediate post treatment and in the longer term. Though consistent, the association between this variable and outcome appears to be modest. Craig concluded that relapse is likely to be related to a combination of factors interacting together.

More research is needed to identify variables that may be related to fluency maintenance and to determine how they may interact. Furthermore, given that post treatment relapse is a significant clinical problem that affects a substantial proportion of clients, research is needed to identify methods to facilitate maintenance of clinical gains over time and prevent the occurrence of relapse.

Given that maintenance of fluency in advanced stuttering may require long term effort and support, optimal methods of facilitating maintenance will be those that can be self-administered on a self-managed schedule. Practical strategies that can meet this requirement and that have shown potential for enhancing fluency maintenance would be a valuable addition to a comprehensive maintenance package. Video self-modeling (VSM) is such a method of behavior change and is the major focus of this paper. It has demonstrated potential in facilitating fluency, and will be described below.

Video Self-Modeling

Video self modeling (VSM) is an intervention wherein individuals observe videotapes of themselves performing only desired target behaviours (Dowrick, 1983). Such an activity is purported to effect behaviour change such that one performs the target behaviour after a certain number of viewings (Meharg & Woltersdorf, 1990)

Applications of VSM involve the following basic procedure (Meharg & Woltersorf, 1990):

1. videotaping a subject's behavior under either natural or staged conditions;
2. the editing out of undesirable behaviors, distress, and external support or, conversely, generating a videotape displaying only the desired behavioral sequences and skills;
3. the repeated viewing of the edited videotape by the subject; and
4. empirical evaluation of the subject's post-viewing behaviour.

There are two major types of VSM, *Feedforward* and *Positive Self-Review (PSR)*. Feedforward, in contrast to feedback, is the use of self-modeling to depict a desired skill not yet acquired *or* not previously demonstrated in a challenging context. Feedback, on the other hand, involves unedited self-observation of one's previous or present performance, which can include both desirable and undesirable behaviors. Feedforward, unlike feedback, only depicts exemplary behaviours and thus allows viewers to see themselves as "they might be like, rather than simply how they are at the time" (Meharg & Woltersorf, 1990, p. 86; Dowrick, 1991).

Positive self-review (PSR) is the 'catch me being good and remind myself of it' procedure. PSR reconstructs an exemplary behavior that has *already been achieved*, but is presumably in need of strengthening (Dowrick, 1999).

The following feedforward study may help illustrate the difference between the two types of video self-modeling. Dowrick and Dove (1980) examined the effect of VSM on the swimming skills of children with spina bifida. These children, although they were paralyzed below the waist, had the potential to swim like most other children as

they had upper body strength. However, they demonstrated poor swimming skills, and felt especially anxious about the water. During their swimming lessons, the children spent most of the time reducing their anxiety in the water, with just a few minutes for the lesson.

To examine the potential of VSM to improve swimming skills, the authors created 2-minute VSM tapes of each child by recording them so that they appeared to be swimming like most children. This was accomplished by having a therapist in the pool provide physical support for the children. However, this physical support was out of view from the camera, so that on video it appeared as if the subjects were swimming by themselves. The children were then asked to view their VSM tapes three times per week. The authors reported that, after 5 viewings, the children demonstrated significant improvements in swimming performance, to the point that during subsequent swimming lessons they spent only spent 5 minutes getting used to the water (as most children do) and 40 minutes improving their swimming skills.

This study is a clear example of feedforward since the tapes depicted the children performing a skill they had not yet acquired, that is, swimming at the level of most other children. If the subjects in the above study *were already able* to swim well by themselves, but only for a few seconds at a time, video self-modeling could also be used, as above. Their lessons would be recorded, but the videos would be edited so that only instances of the children swimming well by themselves would be seen on tape. This would be an example of a PSR method in that the subjects would be viewing behaviours that they were already able to perform correctly, though infrequently.

Video Self-Modeling and Behaviour Change

VSM has been shown to successfully promote behaviour change in people with a variety of disorders such as selective mutism (Pigott & Gonzales, 1987), attention-deficit hyperactivity disorder (Woltersdorf, 1992), autism (Wert & Neisworth, 2003), and Tourette's syndrome (Clarke, Bray, Kehle, & Truscott, 2001). VSM has also been successfully applied to problems such as adolescent depression (Kahn, Kehle, Jenson, & Clark, 1990) and inappropriate classroom behaviour (Kehle, Clark, Jenson, & Wampold, 1986). In addition, it has been used effectively to improve academic skills (Hitchcock, Dowrick, & Prater, 2003) and performance in various sports (Gipson, McKenzie, & Lowe, 1989). In a review of video-self modeling interventions, Dowrick (1999) concluded that there is considerable support for the effectiveness of VSM as an intervention to promote behaviour change.

In studies that have examined both VSM and other methods of behaviour change, VSM has compared favourably. Starek and McCullagh (1999) compared VSM to *peer modeling*, or watching videos of peers rather than of oneself. In their study, beginning adult swimmers learning to improve their skills either watched themselves on video swim correctly (VSM group) or watched a video of another person swim correctly (peer modeling group). VSM was found to be more potent in improving swimming skills than peer modeling. Another study, aimed at reducing disruptive behaviour of five students attending a school for behavior-disordered youth, also demonstrated VSM to be superior to peer modeling (McCurdy & Shapiro, 1988).

Studies have reported feedforward to be more effective than feedback (Bandura, 1986; Dowrick, 1991). Hosford (1979, as cited in Hosford, 1980), for example, compared

the effect of VSM, video feedback, and training *without* video feedback in reducing inappropriate counsellor interviewing behaviour. Though all interventions helped, only VSM completely eliminated inappropriate interviewing behaviours. Feedback, in fact, has been reported to have potentially negative results. For example, Raymond and Dowrick (1993) found that women who viewed themselves on videotape for the first time doing mock job interviews reported more negative feelings and anxiety, and also smiled more frequently than did those who viewed a peer or a nature scene. The smiles, according to the authors, likely reflected embarrassment.

Video self-modeling has also been shown to be superior to training without video. In the study previously discussed (Hosford, 1979, as cited in Hosford, 1980), VSM was found to be superior to training without video in reducing negative interviewing behaviour in counsellors. Another study by Wert and Neisworth (2003), which compared training without video to VSM in improving spontaneous requests of autistic children, reported success only with VSM.

Creer and Miklich (1970) compared VSM to role-play with a 10-year-old boy who displayed immature and non-assertive behaviours for his age group. He role played appropriate behaviours, and later viewed himself on tape performing these behaviours. The authors reported that role-play, by itself, had no effect on the child's inappropriate behaviour. However, his viewing of the video taped role-play daily for 2 weeks resulted in a positive change.

Meharg and Woltersdorf (1990), in their review of 27 studies examining VSM, reported that all studies provided support for the effectiveness of VSM in remediating

behaviours. When VSM was compared with other treatment conditions in these investigations, it was shown to be as effective or more effective as other methods.

Video Self-Modeling and Change in Associated Affective and Cognitive States

Although studies of VSM are typically directed at evaluating its effect on behavior, a few studies have also examined its effect on self-report measures of affect and cognition as well as on directly observable behavior. These studies have demonstrated that behavioral change induced by VSM is often accompanied by a corresponding change in affective and cognitive variables.

A study by Rickards-Schlichting (2002) demonstrated VSM's potential to change negative affect and behaviour related to public speaking. In a single subject A-B study, seven students who had elevated levels of self-reported public speaking anxiety made public speeches to a randomly selected audience on 5 separate occasions (baseline phase). In the intervention phase, students viewed video self-modeling tapes. These tapes were made so that observable behavioural manifestations of participants would not depict any anxiety. Rather, they would appear relaxed throughout. In the follow-up phase, like the baseline phase, the students again presented several speeches, but to a different randomly selected audience.

Although the observable behavioural manifestations of public speaking anxiety were the target of intervention, two other types of anxiety - self-reported public speaking anxiety and self-reported state anxiety - were also measured. Results indicated significant improvement for all types of anxiety at follow-up compared to baseline, indicating an improvement in both observable behaviour and attitude. These changes were maintained throughout the follow-up phase.

The author speculated that:

> The VSM intervention may have increased the participants' belief in their ability to control the public speaking situation. At the follow-up phase, this belief in control of the situation may have reduced the participants' fear of public speaking, and thereby, allowed the opportunity for new learning of public speaking skills afforded by the self-modeling tapes. (p.64)

Another study by Dowrick and Jesdale (1990, as cited in Dowrick, 1999) illustrated the potential of VSM to alleviate negative affect and cognition of depressed individuals. It has been shown that depressed people tend to have difficulty in identifying positive features of their lives (Pyszczynski, Holt, & Greenberg, 1987). Dowrick and Jesdale (1990) sought to examine VSM's potential to change this, with the intention of elevating the mood of these individuals. VSM tapes were made by videotaping conversations between each subject and an interviewer about topics that were interesting, positive, and future oriented. These conversations brought about smiles, animated speech, and other indicators of pleasure. Two to 2.5 minute videos were then created that depicted only verbal and nonverbal content that showed positive mood. The authors reported that within two or three viewings, the participants experienced significant improvements in mood, as measured by a depression and anxiety scale.

Although VSM has shown potential in alleviating negative affect and cognition, it is unclear whether the improvement in these variables comes about as a consequence of the change in the problematic behavior or if it is directly induced by VSM. Nevertheless, negative affective and cognitive states such as anxiety, low self-esteem, low self-efficacy, depression, shyness, fear, inhibition, and negative self-perceptions, which have been

associated with various problem behaviours, have been shown to improve with the use of VSM, as indicated in the above studies as well as several others (Bradley, 1993; Dowrick, 1986; Dowrick, 1991; Dowrick, 1999; Germaine & Dowrick, 1985, as cited in Dowrick, 1991).

Advantages of VSM

Along with VSM's demonstrated efficacy in inducing behavioural, as well as affective and cognitive change, Clark, Kehle, Jenson, & Beck (1992) pointed out several practical advantages: (a) VSM intervention is unobtrusive. Thus, people can watch their video wherever, whenever, and, if they so wish, with whomever they please; (b) It is inexpensive – once the video is made, all that is required is equipment that can play VHS tapes, DVDs, or CD-ROMs, such as a VCR, DVD player, or computer; (c) It potentially has high interest value for the observers since they watch a video of themselves performing exemplary behaviours (Clark & Kehle, 1992); (d) It can be watched as many times as one wishes, and (e) It can easily be self-administered by most people. Also, most VSM studies have achieved positive results with relatively short samples (Dowrick, 1999). For example, two studies of VSM's effect on selective mutism reported dramatic improvements in behaviour using videos that were only 1-2 minutes (Blum, Kell, Starr, Lender, Bradley-Klug, & Osborne, 1998) or 3.5 minutes long (Pigott & Gonzales, 1987).

As well, only a relatively small number of viewings are typically needed to produce the desired effect (Dowrick, 1999; Hitchcock, Dowrick, & Prater, 2003; Meharg & Woltersorf, 1990). In Davis (1979), for example, VSM significantly reduced a child's hostile behaviour towards his peers and teacher even on the first day of intervention –

whereas other methods were unsuccessful. Further, most studies report effects within the first 3 viewings (Dowrick, 1999).

Proposed Reasons for VSM Effectiveness

The mechanisms underlying the demonstrated efficacy of VSM in producing changes in behaviour and associated states is most commonly explained within the framework of social learning theory (Bandura, 1997; Hosford, 1980; Meharg & Woltersdorf, 1990). This will be discussed first, followed by an alternate explanation, which is based on research on the alteration of memory.

Bandura (1997) suggested that VSM is effective because when a person watches him/herself perform successfully, clear information is provided on how best to perform a given skill and belief in one's capability is strengthened (i.e., expectations of self-efficacy). According to social learning theory, to learn these skills by observation, four operations must be present: attention to modeled behaviours, retention of information observed, capability to imitate the behaviours, and desire and motivation to do so (Bandura, 1986).

Viewing of VSM tapes provides the ideal circumstance for observational learning, provided that the observer has the capability to imitate the target behaviour (Bandura, 1977; Meharg & Woltersdorf, 1990). Studies in observational learning have indicated that the learning process is enhanced when observers share similar attributes with the model (Dowrick, 1991; Hosford, 1980). Such attributes include age, gender, race, and social background (Hosford & Mills, 1983; Kazdin, 1974). In VSM, since the observer is the model, this similarity is maximized, thus increasing the potential for learning (Dowrick, 1999; Hosford, 1980).

Indeed, research indicates that people become emotionally aroused when they see themselves on screen and will thus pay close attention (Fuller & Manning, 1973). However, according to social learning theory, learning through self-modeling can be affected by how observers perceive themselves on video. If the observers perceive the model (i.e. themselves) in a positive light, for example, in terms of attractiveness, status, prestige, and power (Clark et al., 1992), learning is enhanced as the observer will aspire to imitate the model (Kagan, 1958; Thelen, Fry, Fehrenbach, & Frautschi, 1979). Learning may be hindered if the observer has the opposite perception (Clark et al., 1992). In VSM, the observer is able to see himself performing exemplary, and hence appealing and desirable, target behaviours through the use of video. This maximizes the potential for learning (Hosford, 1980). Several studies have confirmed that the operations involved in observational learning are enhanced by self-modeling. It has been shown to increase attention (Hosford, 1980), motivation (Fuller & Manning, 1973), and learning (Bandura, 1986).

VSM may provide the ideal conditions for the operations of attention, retention, and motivation, if one has the potential to imitate the given target behaviour. This possible effect of VSM has been proposed to strengthen people's belief in their capability to perform a given behaviour, that is their self-efficacy (Bandura, 1997).

Self-efficacy.

Self-efficacy is an attitudinal feature that has particular relevance to VSM. Self-efficacy refers to an individual's belief that he or she has the personal capability to achieve a desired result (Bandura, 1997).

Self-efficacy is one of the major constructs that has been proposed to explain the effects of VSM in the amelioration of problematic behaviours (Dowrick, 1999). In their review of VSM and its use for various disorders, Meharg and Woltersdorf (1990) stated that "The strongest empirical support for a theoretical understanding of VSM effects suggests that cognitive changes involving increased self-efficacy may account for at least some of the therapeutic gains in some people" (p. 88).

Several studies have provided support for this viewpoint (Bradley, 1993; Gonzales & Dowrick, 1982, as cited in Meharg and Woltersdorf, 1990; Holman, 1991). For example, in a study that used self-modelling with children who had math difficulties, Schunk and Hanson (1989) found that improvements in math performance were strongly related to an increase in self-efficacy. In their investigation, they compared the following groups: (a) those who watched videotapes of themselves successfully solving math problems, (b) those who watched videotapes of their peers successfully solving math problems, and (c) those who did not watch videos. Although all groups received math instruction, they found that, compared to children who did not observe their tapes, children who watched their tapes or the tapes of their peers demonstrated higher math skill acquisition and higher levels of self-efficacy. Schunk and Hanson (1989) argued that self-efficacy has an important influence in the self-modeling process.

Studies that have shown VSM to be beneficial for people with depression or low self-esteem (Dowrick & Jesdale 1990, as cited in Dowrick, 1999; Kahn, 1989), strongly suggested the important contribution of expectations of self-efficacy for positive attitudinal change. As Meharg and Woltersdorf (1990) pointed out, in these studies, a positive outcome would not be expected if factors such as model saliency or observer-

model similarity were solely responsible for the change produced by VSM. Rather, since this group tends to have negative self-perceptions, seeing themselves on tape would seemingly create poor conditions for behaviour change, even if the tape depicts them performing exemplary behaviours. The fact that those who suffer from depression and low self esteem benefitted from VSM suggests that a change in self-belief, or perceptions of self-efficacy, brought about by watching their own exemplary behaviours, was the major factor in behaviour change (Meharg & Woltersdorf, 1990).

Alteration of memory.

An alternative explanation of the effectiveness of VSM was put forth by Kehle, Bray, Margiano, Theodore, and Zhou (2002). They suggested that VSM changes behaviour by modifying, in some way, the individual's memory. The authors drew upon research on the alteration of memory and asserted that studies have unequivocally shown that memory could easily be altered by several methods (presented verbally or visually), such as misattribution and suggestibility. In addition, they indicated that although research was limited, alteration in memory could also change one's behaviour. The authors discussed a study by Braun and Loftus (1998) that investigated the effects of misinformation in advertising. In this study, it was found that memory changes due to the presentation of misinformation to consumers, directly affected their subjective judgments and choice decisions. This behaviour change, according to Braun and Loftus, occurred *when the misinformation was particularly salient.* Kehle et al. (2002) proposed that VSM would exceed the effects of visually conveyed advertising reported in Braun & Loftus. This is because in VSM, model saliency is increased due to an ideal observer-model similarity (i.e., observer=model), and multiple viewings of VSM tapes over several

weeks capitalize on the spacing effect resulting in better learning. The authors encouraged empirical investigations to investigate this hypothesis.

Video Self-Modeling and Maintenance of Behaviour Change

Although research is limited, studies of VSM intervention have reported that its effects appear to endure beyond the time of active viewing. Hosford and Brown (1976) for example, used VSM and assertion training with an adult who was reported to have "a pervasive lack of social skills in nearly all interpersonal situations." Using a single subject research design, they measured his levels of satisfaction in interpersonal situations. After the baseline phase, where the subject reported a low level of satisfaction, assertion training was introduced for 2 weeks, which increased his level of satisfaction. Once training ceased, his score dropped down to baseline levels. When training was then re-introduced along with VSM, however, his score increased considerably and stayed at this level for 7 weeks. When both training and VSM were then withdrawn, his level of satisfaction continued to increase for the remainder of the study (5 weeks).

In a review of 18 school-based studies, Hitchcock, Dowrick, and Prater (2003) noted that 16 studies checked for maintenance of behaviour change after completion of VSM intervention. Of the 16 studies, 15 showed evidence of successful maintenance. It should be noted, however, that most of the studies (a) had a low number of subjects, (b) used some form of multiple baseline design, and (c) had relatively short follow-up periods, ranging from 2 days to 6 months (though 2 studies had follow-up periods of 1 or 2 years). Although more studies need to be done with a focus on improving the above issues, Hitchcock et al. (2003) asserted that the maintenance results of these studies were remarkable given that these studies did <u>not</u> focus on strategies for maintenance. They also

suggested that maintenance could be enhanced if subjects viewed their tapes during school breaks. Dowrick (1991) indicated that this procedure had been followed to prevent the deterioration or loss of skills during school holidays.

Video Self-Modeling and The Treatment of Stuttering

A few articles describing the application of video self-modeling to the treatment of stuttering have appeared in the literature. All have been case descriptions or single subject experiments.

Daly (1987) discussed the use of video in the challenging task of transferring fluency from the clinic to the home environment. He provided case descriptions of two clients who had attained fluent speech within the clinic, had their fluent speech videotaped, and then viewed the tapes at home with their families. Self-reports revealed that after watching the tapes, both the clients and their families were enthusiastic, and the clients had a positive self-belief in their ability to be fluent. One of the clients also reported that his fluency from clinic transferred to the home environment. An obvious limitation in this study is that reports were anecdotal, based only on informal clinical observation and client comments.

Hosford (1976) reported on a 26-yr old inmate who sought counselling for his stuttering. Audiotapes were recorded while he spoke during counselling sessions, and then edited to make audio self-models (rather than video self-models), so that the tapes depicted only fluent speech. The subject listened to his audio self-modeling tapes every day for 3 hours a week for 12 weeks. At the end of the 12-week period, a significant reduction in stuttering was noted (from 8.7 times per minute to 0.8 times). Stuttering levels remained low at the 3-month follow-up. While audio-self-modeling was the

principal treatment of the subject, Hosford indicated that the treatment used an 'operations research design' wherein audio-self-modeling was one strategy in a treatment package that involved other strategies. Thus causal inferences cannot be made as to self-modeling's effect on the subject's fluency.

To date, only a few experimental studies have been published on the effects of video self-modeling on people who stutter (Bray & Kehle, 1996; Bray & Kehle, 1998; Webber, Packman, & Onslow, 2004). All used single subject multiple baseline designs and focused on VSM as the sole treatment method.

In Bray and Kehle (1996), three adolescents who stuttered watched VSM tapes of themselves on 6 occasions over 5 weeks. For each student, there were three tapes, each 5-minutes in duration, depicting the student speaking fluently in different academic situations. The tapes were made in the classroom by having teachers and fellow students ask scripted questions of the subjects, who provided scripted answers. The tapes were then edited to depict fluent speech. At the end of the 5-week intervention period, all students demonstrated a significant reduction in stuttering in school and other settings. It should be noted that all subjects had received previous speech treatment based on prolonged speech. Follow up measures taken up to 4 years post therapy suggested that all four subjects maintained their fluency gains. (Bray & Kehle, 2001)

Bray and Kehle (1998) conducted a replication of their 1996 study using similar procedures with four school-aged children. These participants watched their VSM tapes on 7 occasions over 6 weeks. For these students, there were two tapes, each 5-minutes in duration. At the end of the 6-week intervention period, all the students demonstrated a reduction in stuttering to below baseline levels. However, only two of the four subjects

experienced a substantial and consistent reduction. The other two students experienced a reduction to below baseline levels (i.e. 4% syllables stuttered), but it was not consistent. It should be noted that two of the four subjects had received previous speech treatment. Only one of these experienced a dramatic and consistent reduction in stuttering. Follow up measures taken up to 2 years post intervention suggested that two of the four subjects maintained their fluency gains. The two subjects who did not maintain their fluency gains were the same subjects who did not maintain a consistent reduction in stuttering immediately following the original intervention (Bray & Kehle, 2001).

Webber, Packman, and Onslow (2004) investigated whether reduction of stuttering found in Bray and Kehle (1996; 1998) could be directly attributable to VSM intervention by controlling for potential confounding factors. In their study, the effects of previous treatment were controlled for as their subjects, 2 adults and 1 adolescent, either never received treatment or received unsuccessful treatment over 15 years prior to the investigation. In addition, further possible confounding effects were minimized by investigating subjects only under laboratory conditions.

For each of the 3 participants in their study, three, 5-minute video self-modeling tapes were made depicting the subjects conversing fluently to an investigator in a quiet room. A single subject withdrawal baseline design was used (i.e. A1; B; B+C1; A2; B+C2). Assessments of each phase were taken by having the subject speak in monologue over several sessions. During the first intervention phase, subjects watched their VSM tape prior to speaking. The same procedure was followed in the second intervention phase, but subjects were also given specific instructions to "speak like you do on the video".

Results indicated a significant reduction in stuttering for one of the adult subjects. The adolescent did not show treatment effects and no conclusion could be made about the other adult subject due to doubts about the reliability of the stuttering frequency data.

In accounting for differences between their investigation and Bray and Kehle's (1996; 1998) studies, Webber et al (2004) suggested that the past treatment history of Bray and Kehle's subjects may have acted as a mediator for VSM's positive effects. In other words, the authors suggested that VSM may have facilitated the subjects' use of fluency skills acquired through previous treatment. Consequently, they suggested the possible use of VSM as a fluency maintenance strategy after successful treatment.

VSM and Its Potential for Facilitation of Fluency Maintenance

Investigations of the effects of VSM on various problem behaviours point to its potential as a fluency maintenance strategy. There are several reasons for this line of reasoning:

First, as indicated earlier, while studies of various problem behaviours have demonstrated the maintenance of positive behaviour change after VSM treatment, it has been suggested that continued viewing of VSM tapes can enhance maintenance (Dowrick, 1991; Hitchcock et al., 2003). Indeed, continued watching of VSM tapes has been used in schools to prevent deterioration or loss of skills during school holidays (Dowrick, 1991). In the same way, VSM can conceivably be used after stuttering therapy to prevent deterioration or loss of skills learned in clinic.

Second, the practical advantages of VSM make it a potentially convenient and efficient maintenance strategy. Investigations have indicated VSM to be inexpensive,

unobtrusive, and easily self-administered. It has also been shown to be a potent strategy, requiring only a few short viewing sessions to achieve effects.

Third, Bray and Kehle's (1996) study provides some limited evidence for the potential of VSM as a fluency maintenance strategy. In that study, immediately after treatment, subjects were given their self-modeling videotapes and were allowed to view them as often as they wished. All subjects viewed their videos on occasion and displayed substantially reduced stuttering for at least a year post-treatment. The VSM tapes were then taken back by the investigators, preventing further viewings. At 24 months post-treatment, a follow up probe revealed that only subject 2 did not maintain his fluency gains. Interestingly, after the 24-month follow-up, the subjects were again permitted to view their tapes and subject 2's stuttered words reduced from 33% at the 24 month follow-up to 5% at 48-months, a level below his immediate post-treatment rate (Bray & Kehle, 2001). While this dramatic reduction in stuttering after resumption of viewing VSM tapes suggested a possible effect, subject 2 had also received speech therapy services subsequent to the 24-month follow-up, which prevented any definitive interpretation about the effect of VSM on fluency maintenance.

Finally, once clients complete therapy and return home, VSM can help clients perform maintenance tasks in a similar manner as was done in the latter stages of treatment. This can help clients effectively carry out maintenance activities that are prescribed by many treatment programs. In therapy, clients initially practice new speech skills in structured clinic situations, and then gradually use and evaluate, or 'transfer' their skills in increasingly demanding situations beyond the clinic. They are also encouraged to do *ongoing practice*, or continued practice of these skills in all their daily

activities (Langevin & Boberg, 1993). Once clients have completed therapy and return home, they already have an adequate conception of the behaviour, and can continue transfer and ongoing practice activities in different environments. By using VSM, clients can alternate these activities with watching the exemplary behaviours depicted on their VSM tape. Thus VSM allows clients to continue the process of alternating cognitive and behavioural components of treatment that they were doing in the latter stages of therapy. This use of VSM was strongly recommended by Bandura (1986) who asserted that "the highest level of learning is best achieved by first organizing the modeled behaviour cognitively and then alternating cognitive and motor performances" (p. 62). VSM has been thus purported to help clients *consolidate* new skills and adjust to challenging environments (Dowrick, 1999).

VSM also can be useful by helping clients handle emotional and attitudinal challenges that may occur during maintenance. When clients return home, they will likely not have the same type of support they had in clinic from clinicians and the other clients. In many cases, when clients return to their homes after treatment, they are on their own to continue doing maintenance activities such as transfers and ongoing practice.

Using their fluency skills in these new environments can be a challenge without these supports. Old, counter-productive attitudes, feelings, beliefs, anxieties that were dealt with in therapy, can begin to re-surface and interfere with proper use of techniques. Indeed, those who are susceptible to anxiety arousal, as are some people who stutter (out of fear of stuttering) (Bloodstein, 1995), can become self-occupied with their perceived inadequacies in the face of difficulties rather than focusing on the task at hand (Sarason, 1976). It is these negative emotions and attitudes that many clinicians believe make it

less likely for clients to maintain gains in therapy (Bloodstein, 1995; Gregory, 2003). Indeed, in Craig and Hancock's (1995) survey of clients attempting to maintain their fluency skills after treatment, 60% of those who did not maintain these skills reported that negative emotions were associated with their relapse.

It is for these reasons that various researchers have stressed that effective therapy must go beyond simply treating overt stuttering behaviours and also focus on affective, cognitive and behavioural aspects of stuttering (Bloodstein, 1995). VSM, as indicated earlier, has been shown to not only help people with various problem behaviours, but also, at the same time, reduce associated negative emotions and cognitive states. If VSM is found to have a similar facilitating effect on emotional and attitudinal aspects of stuttering, it would enhance its value as a fluency maintenance strategy.

In sum, there is a substantial body of evidence that suggests VSM is an effective method of inducing change in both problem behaviours and associated counterproductive psychological states. Preliminary evidence also suggests that VSM can be effective in reducing stuttering and points to its potential value as a fluency maintenance method.

Accordingly, the purpose of this study is to explore the effectiveness of video self-modeling (VSM) in facilitating maintenance of clinical gains post treatment.

In keeping with this purpose, the following primary research questions will be addressed:

1. What is the effect of video-self modeling on post-therapy fluency maintenance?
2. What is the effect of video-self modeling on post-therapy maintenance of affective and cognitive reactions to stuttering?

3. What is the effect of video-self modeling on post-therapy maintenance of perceptions of self-efficacy?

Method

A 2 X 4 mixed design was used to assess the effect of video self-modeling (VSM) on the maintenance of fluency and a 2 X 2 mixed design was used to assess the effect of VSM on the maintenance of associated affective and cognitive variables and on perceptions of self-efficacy.

Participants

Participants were clients who had recently completed an intensive therapy in two successive programs at ISTAR, the Institute for Stuttering Treatment and Research. The ISTAR Comprehensive Stuttering Program (CSP) (Boberg & Kully, 1985; Kully & Langevin, 1999) integrates strategies that enhance fluency control and manage stuttering with cognitive-behavioral skills that achieve improved attitudes, confidence and social skills. See Appendix A for additional details of the ISTAR program. In the third and final week of the clinic, all clients were invited to take part in this study, except: (a) those who had co-existing problems such as deficits in cognition, speech motor performance or language processing, (b) those under 14 years of age, and (c) those who did not have access to a VCR, DVD player or computer. Three clients fell into at least one of these categories and thus did not meet the criteria for the study. Of the 14 clients who met criteria for the study, 11 chose to participate. These 3 female and 8 male participants ranged in age from 14 to 58. Half of these participants were randomly assigned to the video self-modeling (VSM) group and the other half to the treatment as usual (TAU) group. To randomly assign subjects to their groups, the investigator first ordered the

birthdates of participants from earliest to latest. Then, starting from the earliest birth date, he alternately assigned subjects to either the VSM or TAU group. Thus the participant with the earliest birth date was assigned to the VSM group, the participant with the second earliest birth date was assigned to the TAU group, and so on.

Clients from both groups had received treatment for stuttering previous to the ISTAR intensive clinic, with the amount of treatment ranging from a few weeks to many years. The type of treatment varied among participants, but most clients from both groups received therapy that contained at least some elements of fluency shaping, stuttering modification, or a combination of both. Other clients either could not recall the type of therapy received or had undergone other, non-traditional types of treatment. Three of the clients in the VSM group considered their previous therapy to be successful, while the remaining three did not. Of those who reported successful treatment, one received treatment periodically over the three years prior to the ISTAR program, while the other two received treatment more than ten years prior to the ISTAR program. The clients in the TAU group generally did not consider their therapy to be successful, though four of these clients reported experiencing short-term benefits.

Equipment and Materials

Client pre and post-treatment video and audiotaped speech samples, which are routinely collected and analyzed during the intensive clinic, were provided for analysis in this study. Follow-up audio samples, used for this study, were also collected. A digital mini DV video camera (JVC-VS200) and lavalier microphone (Schure MX1BP), along with blank videotapes were used to collect the video samples. A tape recorder, audiotapes, and a telephone recording system (Nexxtech recording controller) were used

to collect the audio samples. To analyze the speech of clients, electronic behaviour counters were used. Some editing of the post-treatment video samples was required. A video-editing software program, Pinnacle studio version 9.1.2, was used for this purpose. These edited video samples were copied on to Digital Video Disks (DVDs).

Dependent Measures

Speech Measures

The client pre and post-treatment video and audiotaped speech samples were approximately 2 to 3 minutes in length and consisted of telephone calls made by subjects to business establishments. Follow-up client speech samples consisted of telephone conversations with the investigator. These samples, which were 2 minutes in length, were collected once every two months, for six months. Thus, a total of three follow-up samples were obtained for each participant. All speech samples were analyzed to measure the dependent variable, fluency. Fluency was expressed as percent syllables stuttered (%SS) and syllables per minute (SPM). Both of these variables have been shown to be reliable measures of fluency outcome (Andrews & Ingham, 1971).

Reliability of speech measures.

Speech samples were analyzed by the investigator to determine the %SS and SPM. To obtain inter-rater reliability estimates, 8 randomly selected speech samples representing 14.5% of the total of number of speech samples (55) were rated by another, independent rater. The raters were trained in the use of a set of counting guidelines developed at ISTAR (Boberg & Kully, 1994). The intra-class correlation coefficients (two-way mixed effects model) for inter-rater reliability for the two raters was .960 for %SS and 0.947 for SPM, indicating high reliability. To determine intra-rater reliability,

11 randomly selected speech samples, representing 20% of the total of number of speech samples (55) were re-analyzed by the investigator. The intra-rater reliability, also calculated by an intra-class correlation coefficient (two-way mixed effects model), was 0.995 for %SS and 0.998 for SPM, indicating high reliability

Questionnaire measures

The following series of questionnaires that are routinely administered at ISTAR (Kully & Langevin, 1999; Langevin & Kully, 2003) and used in other clinical settings across North America as part of the evaluation of clinical outcomes, were given to clients to complete at pre-treatment, immediate post-treatment and at 6 months follow-up to measure the dependent variables, self-efficacy and affective/cognitive reactions to stuttering.

The Self-Efficacy Scaling by Adult Stutterers (SESAS) and Self-Efficacy Scaling for Adolescents (SEA) (Ornstein & Manning, 1985) were used to measure self-efficacy (See Appendices B and C). In the SESAS questionnaire, clients estimated: (a) their confidence for entering and speaking in various speech situations (approach scale), and (b) their fluency in these same situations (performance scale). Both scales consisted of 50 items, each item representing a different speaking situation. In the SEA questionnaire, a 100 item scale, adolescent clients estimated their confidence for entering and speaking in 100 different speaking situations. Lower scores on the SESAS and SEA indicated reduced confidence. Ornstein and Manning (1994) reported that for both the approach and performance scales of the SESAS questionnaire, adults who stuttered scored significantly lower (66.2; 55.8) than the adults who did not stutter (94.2; 98.0). For the

SEA scale, Manning (1994) reported that adolescents who stuttered scored significantly lower (mean=7.21;SD=1.8) versus adolescents who do not stutter (mean=8.65;SD=1.2).

Three other questionnaires were used to assess affective and cognitive correlates of stuttering. The Perceptions of Stuttering Inventory (PSI) (Woolf, 1967) was used to measure self-perceptions of stuttering (See Appendix D). This test consisted of 60 items, with 20 items each representing the three parameters of struggle, avoidance, and expectancy. Higher scores indicated negative perceptions of stuttering The PSI is an expansion of Rothenberg's (1963) measure of perception of stuttering, which itself is a revision of Powell, 1963. Rothenberg's inventory demonstrated high test-retest reliability among adult stutterers, yielding correlations of .88, .89, and .85, for struggle, avoidance, and expectancy, respectively. The PSI is also a commonly used measure of client perceptions of stuttering (e.g., Blomgren, Roy, Callister, & Merrill, 2005; Ginsberg, 2000; Langevin & Kully, 2003).

The Revised Communication Attitude Inventory (S24) (Andrews & Cutler, 1974), a 24-item True and False scale, measured client communication attitudes that accompany stuttering (See Appendix E). Higher scores indicated negative attitudes. The S-24 has been shown to differentiate between stutterers and non-stutterers (Andrews & Cutler, 1974).

The Locus of Control of Behavior (LCB) (Craig, Franklin, & Andrews, 1984), a 17-item Likert- type scale, was used to measure "the extent to which subjects perceive responsibility for their personal problem behavior" (Craig et al, p. 174). Higher scores indicated a more external locus of control (see Appendix F). The LCB has demonstrated

acceptable internal reliability (Coefficient alpha=0.79), and acceptable test and retest reliability (r=0.90) (Craig, Franklin, & Andrews, 1984).

Procedures

During the final two days of the intensive program, one of the clinicians held a brief meeting with all participants to explain the purpose of the study, procedures to be followed, and potential risks/benefits of participation. The clinician also emphasized voluntary participation and client confidentiality (Appendix G). After the meeting, the investigator obtained consent from clients who agreed to participate in the study (Appendices H-J), client information about previous speech therapy programs attended (Appendix K), and consent for phone call sampling (Appendix L), which is routinely obtained at ISTAR (Boberg & Kully, 1994). In addition, the investigator held brief meetings with participants in the VSM group that included an explanation of the procedures to be used in the VSM program (Appendix M).

The self-modeling samples to be used by clients in the VSM group were constructed by the investigator soon after the immediate post-treatment speech samples were recorded. To create the VSM videos, the post-treatment video samples of clients in the VSM group were edited to eliminate instances of stuttering. Four self-modeling sample situations of 2 to 4 minutes each were created. These samples were of the client (a) conversing with a stranger, (b) reading to a stranger, (c) making telephone calls to businesses, and (d) presenting a speech to a large audience. All four speaking situations for each client were recorded on a Digital Video Disk (DVD).

In the week following the intensive clinic, the investigator mailed the self-modeling videos to the VSM participants with a written reminder of the procedures that

were described in the end-of-clinic meeting (see Appendix M). A follow-up telephone call was made to each client to ensure that the materials were received, confirm that the client understood the instructions, and provide an opportunity for questions.

The video self-modeling procedures were as follows. VSM group participants were asked to view their VSM DVD as often as they wished. However, it was suggested that they watch their videos at least 4 times per month. This minimum viewing frequency was selected in order to be consistent with Bray and Kehle's (1996; 1998) investigations of VSM and stuttering wherein subjects viewed their videos once or twice per week. In the present investigation, participants were also instructed to watch their samples with particular attention to their fluency skills. In addition, they were asked to complete viewing logs (Appendix O) to keep track of how often they were viewing their VSM samples, and to complete video-sample rating forms (Appendix P) to rate how likeable and natural they felt their speech sounded on video. These forms were mailed to them each month in a postage-paid, self-addressed envelope. At the end of each one-month period, they were asked to send their completed monthly forms back to the investigators.

All clients (VSM and TAU) were called once every 2 months, for 6 months. Participants were aware that they would be called, but they did not know exactly when the call would occur. This was to increase the likelihood that samples would be representative of participants' typical speech. After obtaining the participant's verbal consent to record the speech sample, the investigator engaged the client in conversation to obtain at least 2 minutes of client talk time in the speech sample. At the conclusion of the call, subjects in the VSM group were asked if they had been receiving their viewing logs, and reminded to complete and return them if they had not done so.

Questionnaires (Appendices B-F) were mailed to clients at 6 months post-therapy to assess the effectiveness of VSM on attitudes, self-perceptions of stuttering, locus of control, and self-efficacy. At the conclusion of the final 6-month call, participants were asked whether they received the questionnaires and encouraged to complete and return them at their earliest opportunity.

Design

This study used a 2 X 4 design in which the independent variables were Group, having 2 levels (VSM and TAU) and Time, having 4 levels (Immediate Post-Treatment, Two Months Post-Treatment, Four Months Post-Treatment, and Six Months Post-Treatment). It also used a 2 X 2 design, in which the independent variables were Group, having 2 levels (VSM and TAU), and Time, having 2 levels (Immediate Post-Treatment and Six Months Post-Treatment). For the 2 X 4 design, the dependent variables were percent syllables stuttered (%SS), and syllables per minute (SPM) that were measured by analyzing audio and videotaped speech samples. For the 2 X 2 design the dependent variables were obtained using the scores of the previously described instruments, the S-24, PSI, LCB, and SESAS/SEA, which relate to affective and cognitive reactions to stuttering and perceptions of self-efficacy.

Data Analysis

To answer the first research question, data were analyzed to compare the fluency of the VSM group with the TAU group at post-treatment and at the three follow periods. This was tested using a 2 X 4 two-factor analysis of variance (ANOVA) procedure with each fluency measure, %SS and SPM, as a dependent variable. The calculations were

made using the statistical software, SPSS (Statistical Package for Social Sciences, version 12).

The ANOVA was used to test for significant differences in each dependent variable between both groups and across the 4 time periods. It was also used to test for a potential interaction between Group and Time. The level of significance for each ANOVA was $p<.05$.

An ANOVA was considered the most appropriate statistical procedure to use, as the 2 X 4 design involved more than two conditions, and both dependent variables were comprised of ratio-level data. It should be noted that the data were not normally distributed for several of the conditions. However, the client data entered into ANOVA passed Mauchly's test of Sphericity, thus satisfying the homogeneity of variance assumption of the repeated measures data, allowing for the use of parametric statistical tests.

To answer the second and third research questions, the intention was to analyze data to compare the affective/cognitive reactions to stuttering and the self-efficacy of the VSM group with the TAU group at post-treatment and at 6-month follow-up. These were to be tested using a 2 X 2 mixed ANOVA with scores from the S-24, LCB, and SESAS/SAS questionnaires, and the Kruskal-Wallis One-Way ANOVA with the scores from the PSI. The calculations were also made using the statistical software, SPSS (Statistical Package for Social Sciences, version 12).

A 2 X 2 mixed ANOVA was planned to test for significant differences in each dependent variable, except for the scores on the PSI, between both groups within a given time period and to test for significant differences in each dependent variable within both

groups under the 2 different time periods. To test for significant differences in the scores for the PSI between both groups within a given time period, the Kruskal-Wallis One-Way ANOVA was to be used. To test for significant differences in the scores for the PSI within both groups under the 2 different time periods, the Friedman Two-Way ANOVA was to be used. The level of significance for each ANOVA was $p<.05$

A 2 X 2 mixed ANOVA was considered the most appropriate statistical procedure to use for most of the questionnaires, as it was determined that the mean and median scores of the participants for each dependent variable were very similar except for the PSI. Also, the skewness scores for most tests were considerably less than 2 (a value that indicates significant skewness), permitting an acceptable skewness value for a normally distributed set of test scores. The PSI skewness score (1.5) was close enough to 2 to suggest the possibility of a positively skewed distribution. For these reasons a 2 X 2 mixed ANOVA was considered most appropriate for all questionnaires except for the PSI, for which the Kruskal-Wallis One-Way ANOVA (between-groups) and the Friedman Two-Way ANOVA (within-groups) were to be used.

The fact that several tests were performed, each at an alpha level of .05, raises the question of an inflated experiment-wise alpha. To deal with this, a critical value was determined in order to maintain the experiment-wise error rate at .05. However, as this was exploratory research and it was important to maximize the chances of discovering potentially significant differences, it was decided to allow for an increased experiment-wise error, and use .05 as the level of significance.

Results

The objective of this study was to examine the effect of video self-modeling (VSM) on the maintenance of (a) speech fluency, (b) affective/cognitive reactions to stuttering, and (c) perceptions of self-efficacy after an intensive stuttering therapy program. This section presents the results of the data analyses that were conducted to address these purposes. The results of the tests of the effect of VSM on fluency expressed in terms of percent syllables stuttered (%SS) and syllables spoken per minute (SPM) will be presented first, followed by the scores obtained from the three questionnaires that were given to examine the effect of VSM on affective/cognitive variables. Finally, the scores obtained from the questionnaire that was given to examine the effect of VSM on perceptions of self-efficacy will be presented.

The data pertaining to the first research question, the effects of VSM on fluency maintenance are presented in Tables 1 and 2, which indicate the percent syllables stuttered (%SS) and syllables per minute (SPM) spoken for each client. Each of these two dependent variables was compared for significant differences across both the Group and Time conditions. In each case, comparisons were made using a 2 X 4, two-way, mixed, analysis of variance (ANOVA).

The main effect of Time on %SS was significant ($F_{(3,27)} = 4.089$, $p = .016$). A post-hoc comparison revealed differences between immediate post-treatment ($\bar{x}=3.5$) and 6-month follow-up ($\bar{x}=6.1$), and between 2-month ($\bar{x}=2.6$) and 6-month follow-up ($\bar{x}=6.1$). The main effect of Group on %SS was also significant ($F_{(1,9)} = 5.555$, $p = .043$). Thus the overall mean %SS for the VSM group (2.1%) was significantly lower than the overall mean %SS for the TAU group (6.3%). A post-hoc comparison revealed differences

between the groups at immediate post-treatment (t=-2.95, df=9, p=.008, one-tailed) and at 2-month follow-up (t=-1.969, df=9, p=.04, one-tailed). The former finding pointed to a critical problem that will be addressed in the Discussion section following. The Group by Time interaction effect on %SS was not significant ($F_{(3,27)}$ = .905, p=.452). In other words, the treatment conditions did not differentially affect fluency, measured in terms of percent syllables stuttered (%SS), over time.

The main effect for Time on SPM was not significant ($F_{(3,27)}$ = .345, p=.793). The main effect for Group on SPM was also not significant ($F_{(1,9)}$ = .271, p=.615). Thus the overall mean SPM for the VSM group (169.5 spm) was not significantly higher than the overall mean SPM for the TAU group (151.9 spm). The Group by Time interaction effect on SPM was not significant ($F_{(3,27)}$ = 1.526, p=.230). In other words, the treatment conditions did not differentially affect speech rate, measured in terms of syllables per minute (SPM), over time.

The data pertaining to the second research question, the effects of VSM on the maintenance of affective/cognitive measures are presented in Table 3. Client scores for the S-24 (attitudes), PSI (perceptions) and LCB (locus of control) scales at pre-treatment, post-treatment, and at 6-month follow-up are displayed. The individual scores on each of these tests were to be compared across both the Group and Time conditions. Comparisons were to be conducted by using a 2 X 2 mixed ANOVA for between-group effects and within-group effects for all scales with the exception of the PSI, for which the Kruskal-Wallis One-Way ANOVA (between-groups) and the Friedman Two-Way ANOVA (within-groups) were to be used. However, as shown in Table 3, out of a total of 11 participants, only 45% returned their questionnaires at 6-month follow-up. Only one of

the participants who returned the questionnaires was from the TAU group. Due to the low response rate at 6-month follow-up, it was not possible to perform a statistical analysis to assess the effects of VSM on affective/cognitive variables. To determine comparability of groups at the start of the study, an independent-samples t-test revealed significant differences between the VSM and TAU groups at immediate post treatment on the S24 (t=-2.504, df=9, p=.017, one-tailed) and LCB (t=-1.903, df=9, p=.045, one-tailed).The Mann-Whitney test revealed no significant differences between the groups on the PSI (U=8.0, N1=5, N2=6, p=0.124, one-tailed).

The data pertaining to the third research question, the effects of VSM on the maintenance of perceptions of self-efficacy, are presented in Table 4. Client scores for both the Approach and Performance sections of the SESAS scale (or the SEA scale, for adolescents) at pre-treatment, post-treatment, and at 6-month follow-up are displayed. The client scores from this test were to be compared across both the Group and Time conditions. Comparisons were to be conducted by using a 2 X 2 mixed ANOVA for between-group effects and within-group effects. However, as with the questionnaires that explored other variables, out of a total of 11 participants, only 45%, all except one being from the VSM group, returned their questionnaires at 6-month follow-up. Therefore, it was not possible to perform a statistical analysis to assess the effects of VSM on perceptions of self-efficacy due to the low response rate at 6-month follow-up. To determine comparability of groups at the start of the study, an independent-samples t-test revealed significant differences between the VSM and TAU groups at immediate post treatment for perceptions of self-efficacy in both Approach (t= 1.994, df=9, p=.039, one-tailed) and Performance (t= 1.957, df=8, p=.043, one-tailed).

Discussion

The current study was aimed at examining the effectiveness of video self-modeling (VSM) as a maintenance strategy in stuttering treatment. Specifically, the study examined the effect of VSM on speech fluency, affective/cognitive reactions, and perceptions of self-efficacy of people who stutter after intensive stuttering treatment.

With respect to maintenance of speech fluency, it was found that the mean stuttering frequency of the VSM group was significantly lower than that of the TAU group.

The effect of VSM on affective/cognitive correlates of stuttering and perceptions of self-efficacy could not be assessed due to the low return rate on the follow-up questionnaires that were intended to measure these constructs.

Limitations

A serious limitation of this study was that, although care was taken to randomly assign clients to the VSM and TAU groups, the groups at immediate post-treatment differed significantly from each other in percentage of stuttered syllables, one of the primary dependent variables in this study. Thus, the two groups could not be construed to have been the same prior to the viewing of the videos by the VSM group. If the groups were the same prior to the introduction of VSM, then the difference in fluency noted between the groups after the VSM group viewed their videos could have been attributed to viewing these videos. However, the groups were different prior to the introduction of VSM. Therefore, the difference in fluency noted between the groups after the VSM groups viewed their videos could have been attributed to the group differences prior to the introduction of VSM, rather than the VSM strategy. Any comparison of the fluency of

these groups during the follow-up period would thus be groundless. As such, no conclusions can be drawn from the results of this study in determining the effect of video-self modeling on fluency maintenance.

The investigator was surprised that a significant difference existed between the groups prior to the introduction of the VSM strategy in view of the fact that stringent procedures were followed to randomly assign participants to each group. The probability of such an event occurring was determined by performing a binomial probability calculation that determined the chances of random assignment resulting in (a) most of the participants with a relatively high fluency level being in the VSM group and, (b) most of the participants with a relatively low fluency level being in the TAU group. The probability of both of these occurring was 1.5% or 15 in 1000.

Given this difference between the groups in stuttering frequency, the immediate post-treatment scores of the VSM and TAU groups on the questionnaires that measured affective/cognitive variables and perceptions of self-efficacy were compared to determine if a between group difference in questionnaire scores also existed immediate post-treatment. As indicated in the previous section, the scores of both groups on these measures also differed significantly. This finding precluded making any assessment of VSM on either personal reactions or perceptions of self-efficacy. As with the difference between groups in fluency, since the groups were also different in cognitive/affective reactions to stuttering and perceptions of self-efficacy prior to the introduction of VSM, any effect on these constructs from watching the videos by the VSM group could be attributed to the group differences prior to the introduction of VSM, rather than the VSM strategy. Thus, even if an adequate response rate to questionnaires at follow-up had been

obtained, conclusions about the effects of VSM on these variables of interest would not have been possible.

Participant Compliance

As mentioned, the fact that only 5 of the 11 subjects completed their questionnaires at 6-month follow-up prevented any analysis of the effect of VSM on affective/cognitive reactions and perceptions of self-efficacy. While this low rate of response is a matter of concern, it is difficult to determine why it occurred. As indicated in the procedures, at the 6-month follow-up, subjects were sent their questionnaires in pre-addressed, postage-paid envelopes. The investigator also phoned the participants and reminded them to fill out and return their questionnaires.

It should be noted that, although 2 subjects from the VSM group did not return their questionnaires, only one of the two actually watched the VSM DVD. As the other subject did not watch the VSM DVD, technically he did not participate in the VSM program. Therefore, all subjects who used VSM, with the exception of one, returned their questionnaires, while only one subject in the TAU group returned questionnaires. A plausible explanation for this difference then, is that clients who watched their DVDs felt a greater obligation to complete and return their questionnaires than did those in the TAU group.

Treatment History

In the Methods section under the discussion of Participants, it was noted that while three of the six clients in the VSM group considered their previous therapy to be successful, the clients in the TAU group generally did not consider their therapy to be successful. This apparent difference between the two groups in perceptions of previous

treatment is potentially noteworthy in light of the fact that the groups also significantly differed in their immediate post-treatment performance, as reflected in their post treatment %SS scores and questionnaire scores. The finding that the client group that showed a significantly stronger response to the intensive clinic (ie the VSM group) also reported more positive perceptions of previous treatment invites investigation into the relationship between perceptions of previous treatment and response to current treatment.

Implications and Directions for Future Research

In the future, to increase compliance from subjects in control groups, more reminders to send back questionnaires may be needed along with a strong emphasis on the importance of their feedback to research.

Notwithstanding the major limitations of this study, which prevent drawing any conclusions about the major questions of interest, other notable features were observed.

Likeability and Naturalness of Self-Modeling Samples

Since the likeability and naturalness of one's speech have been reported to affect fluency outcomes (Guntupalli, Kalinowski, & Saltuklaroglu, 2006; Manning 2001, p. 426), *video sample rating forms* were filled out each month by VSM clients, who rated how well they liked their speech samples on video and how natural their speech sounded. The ratings allowed the investigator to evaluate these potential confounding variables to VSM effectiveness, hence helping to establish treatment integrity. That is, it permitted the consideration of likeability and naturalness possibly influencing fluency outcomes.

Results of the forms revealed that VSM clients either agreed or strongly agreed that their speech on video was likeable throughout the follow-up phase. They also had similar opinions about how natural they sounded on the DVD, with the exception of

subject 2 who felt, on average, neutral about the naturalness of his speech. This finding is encouraging since, according to observational learning principles, not only is the viewer's similarity to the model in the video important for learning, but also the viewer *perception* of the model (Hosford, 1980). Having a positive perception of the model (i.e. oneself, in VSM) has been identified as an important factor that influences learning (Hosford, 1980; Perry & Furukawa, 1986). Future studies of VSM and fluency that include an analysis of client perceptions of speech naturalness and likeability on video could provide more information about which features of the video make one's perceptions of the model's speech (i.e., their own speech) natural and likeable, as well as the procedures that may be used during the editing process to facilitate positive perceptions.

Viewing Frequency and Stuttering Frequency

To evaluate treatment compliance, clients were asked to complete viewing logs to indicate the frequency with which they watched their videos. These data then permitted a post-hoc examination of the relationship between viewing frequency and stuttering frequency. The post-hoc analysis suggested a possible inverse relationship between viewing frequency and stuttering frequency in 2 of the 5 participants. A similar finding was also noted in an unpublished study by Harasym (2005), who used an A-B time series design to investigate the effect of VSM on the fluency of 3 adults who experienced relapse after successful stuttering treatment. The 3 participants were instructed to watch their VSM videos at least twice a week for six consecutive weeks. At the end of the six-week period, results of 2 of the 3 participants suggested a relationship between increased viewing frequencies and decreased stuttering frequency.

As mentioned, the lack of an acceptable control group prohibits the authors from drawing conclusions about any possible treatment effects. However, the findings do point to the need for further investigation in this area. More rigorous and controlled investigations that specifically focus on the relationship between viewing and stuttering frequency may provide further information on this relationship and also indicate the amount of viewing needed to maximize the potential for fluency maintenance.

Such an investigation could involve a single subject time-series design (A;B1;B2;B3), ideally replicated across several subjects, with the amount of viewing of VSM videos being the intervention. In the baseline phase, the stuttering frequency of a subject at immediate post-treatment would be measured regularly across a given time period. The intervention phases would then be introduced sequentially where a prescribed amount of viewing would be required from the subject, starting from a low viewing frequency (e.g. twice a week) and, in following intervention phases, moving to higher viewing frequencies (e.g. four times per week to every day). Using such a design, one could hypothesize that stuttering increases with a decrease in viewing frequency, but decreases with an increase in viewing frequency.

Ideally, viewing data would be collected weekly, by e-mail, to evaluate compliance and multiple speech samples would be collected weekly to ensure representativeness of speech performance. An alternative, and potentially more efficient and accurate method for documenting compliance with prescribed viewing frequency might be through the use of streaming video. Self-modeling videos could be uploaded to a protected website by the investigator. Clients could then watch their videos on this website by entering a code. If the video software plug-in has the capability of storing the

frequency and time of client viewing, the investigator could track this information without requiring the client to send in viewing logs.

Conclusions

The attainment of fluency after therapy can be a thrilling life experience for people who stutter. Many stutterers may have rarely, if ever, had the experience of fluent, easy, or comfortable speech. Clinicians, as well, can feel a great deal of satisfaction in that their treatment, backed by evidence from the literature, produces definitive and possibly life-changing improvements in the fluency of their clients who stutter.

However, the reality of relapse for a substantial number of clients after successful stuttering therapy has resulted in somewhat reserved enthusiasm for both clients and clinicians. This thorn in the side of otherwise excellent therapy programs is a matter of major concern. Although several therapy programs do provide clients with maintenance strategies to deal with this problem, the evidence of their effectiveness is limited, as studies on these maintenance strategies are few and preliminary.

While clinicians and researchers continue to look for ways of enhancing the effectiveness of already existing maintenance strategies, they must also look at other novel ways that have shown potential in helping with fluency maintenance.

Video self-modeling is such a method that has shown potential in facilitating fluency maintenance after successful stuttering treatment. A great deal of literature has demonstrated its effectiveness with many problem behaviours and preliminary studies have suggested that its effectiveness may extend into the realm of stuttering treatment and maintenance.

The present study, unfortunately, could not contribute to any further knowledge of the effect of VSM on fluency maintenance, due to the significant differences between the control and experimental groups in stuttering frequency, affective/cognitive reactions, and perceptions of self-efficacy prior to the introduction of the VSM strategy.

While no conclusions could be drawn about the effect of VSM on fluency maintenance, two aspects about the video-self modeling group were noted: first, clients generally liked their speech samples and found them natural sounding. Secondly, there was some indication of a possible relationship between viewing frequency and fluency.

This paper underlined the importance of investigations on the effects of VSM on fluency maintenance. While this study attempted to further the knowledge in this area, it did not meet that aim, due to the reasons mentioned above. It is therefore recommended that this study be re-administered with measures in place to avoid the shortcomings that prevented reaching any conclusions about the major research questions. Such an investigation would need to pay special attention to maximizing subject compliance and minimizing any difficulties with random assignment.

In the present investigation, due to the very tight schedule of the clients on the last days of intensive treatment, it was only possible to randomly assign them to groups prior to the collection of immediate post-treatment speech samples. As such, it was not possible to check for differences between the groups that might have, as in this study, prevented reaching conclusions about the major research questions. Although the probability of such an event re-occurring is unlikely, it would be ideal if participants could be randomly assigned to their groups only following the collection and analysis of

post-treatment speech samples. This would allow for confirmation of group equivalence prior to initiation of the study.

As indicated previously, to increase the return rate of questionnaires from clients, especially those in the control group, additional reminders to send back questionnaires should be given along with a strong emphasis on the importance of feedback to research. To ensure efficient collection of viewing data, weekly e-mails or streaming video that allows tracking of client viewing frequencies could be used.

Re-administering this investigation with the above modifications may maximize the chances of obtaining client data from which additional, clinically meaningful relevant conclusions can be drawn. Such an undertaking would help to advance understanding of video self-modeling and its effects on fluency and potentially make a much needed contribution to the development of effective, evidence-based maintenance strategies for stuttering treatment.

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Appendix A
Description of the ISTAR program

Treatment Program that Preceded Proposed Research

The ISTAR Comprehensive Stuttering Program (CSP) (Boberg & Kully, 1985; Kully & Langevin, 1999) integrates strategies to enhance fluency control and manage stuttering with cognitive-behavioral skills to achieve improved attitudes, confidence and social skills. In the first phase of treatment, referred to as the Acquisition Phase, clients learn fluency skills that address breath control, voice onset, articulatory movement and speech rate. These fluency skills are taught within the framework of prolongation wherein speech rate is systematically increased from less than 60 syllables per minute to a near-normal rate of 190+/- 40 syllables per minute. Clients also begin learning skills to handle moments of stuttering and associated tension. Cognitive-behavioral skills training are also introduced wherein clients begin learning to use effective self-talk to help them manage negative emotions and to approach rather than avoid speaking situations. In the second phase of treatment, referred to as the Transfer Phase, clients learn to progressively apply speech-management and self-talk skills in everyday life and in challenging situations beyond the clinic. During this phase, self-management skills including self-evaluation, self-monitoring and problem solving, which were introduced in the acquisition phase, receive increasing emphasis. The final phase of treatment is the Maintenance Phase, which begins once the 3-week intensive clinic is completed. In this phase, clients work to maintain the progress they made in clinic. Preparation for this final phase of treatment begins in the Acquisition Phase and receives increasing attention during the Transfer Phase. During the clinic, clients prepare for the Maintenance Phase by developing a personal home practice plan, identifying potential barriers and solutions to maintenance, and considering how to make lifestyle changes to expand speaking opportunities. Clinicians guide clients in planning their maintenance program. The clinicians encourage the inclusion of certain important aspects of maintenance such as daily fluency skill practice (5 to10 minutes), transfer exercises, cognitive-behavioral exercises, continued contact with a speech-language pathologist, attendance of refresher courses to review maintenance progress, and joining or forming self-help groups (Boberg & Kully, 1994; Langevin & Boberg, 1993). Clients are encouraged to seek follow-up therapy with a local speech-language pathologist and are also given the opportunity to enroll in follow-up therapy at the ISTAR clinic, including individual sessions by phone and week-end or week-long refresher clinics. A more detailed description of the program can be found in Kully and Langevin (1999).

Investigations of the outcomes of the CSP have provided evidence of its effectiveness immediately after therapy and for as long as 2 years post-treatment (Boberg & Kully, 1994; Langevin & Boberg, 1993)

Appendix B
Self-Efficacy Scale for Adults Who Stutter (SESAS)
Ornstein, A., and Manning, W. (1985)

Name_____ Date_____

INSTRUCTIONS

You will be presented with two lists of 50 speaking situations which commonly occur. While you may not typically find yourself in each of these speaking situations, indicate how you believe you would perform in each situation. Please answer all questions. For the first set of 50 questions ask yourself whether or not you would enter each situation. Under the column CAN DO, check the situations you expect you would enter if you were asked to do them now. Then, for the situations you check under the column CAN DO, mark in the column CONFIDENCE how confident you are that you would enter each particular situation. Rate your degree of confidence by recording one of the following numbers from 10 to 100 using the scale below.

10	20	30	40	50	60	70	80	90	100
QUITE UNCERTAIN				MODERATELY CERTAIN					VERY CERTAIN

To familiarize you with the rating form not the following example:

Situation	CAN DO	CONFIDENCE
1. Lift a 25 pound box above your head	X	100
2. Lift a 35 pound box above your head	X	90
3. Lift a 50 pound box above your head	X	80
4. Lift a 65 pound box above your head	X	70
5. Lift an 80 pound box above your head	X	50
6. Lift a 100 pound box above your head	X	30
7. Lift a 200 pound box above your head	X	_____

Now complete the following example to practice using the rating scale.

Situation	CAN DO	CONFIDENCE
1. High jump 1 foot	_____	_____
2. High jump 2 feet	_____	_____
3. High jump 3 feet	_____	_____
4. High jump 4 feet	_____	_____
5. High jump 5 feet	_____	_____
6. High jump 6 feet	_____	_____

Appendix B, continued

APPROACH ATTITUDE SCALE

If you are sure that you understand the task, please complete the following list of 50 situations by (1) checking whether you feel you would enter each situation and (2) your confidence in that belief. Please make these judgements honestly with respect to your present ability, not according to what you want to do or think you should do. Rate your degree of confidence by recording one of the following numbers from 10 to 100 using the scale below. If you do not feel that you would enter a situation, do not mark that item.

10	20	30	40	50	60	70	80	90	100
QUITE UNCERTAIN				MODERATELY CERTAIN					VERY CERTAIN

WOULD YOU...	CAN DO	CONFIDENCE
1. Talk with a family member during a meal.	_____	_____
2. Request help in an uncrowded department store.	_____	_____
3. Talk to a close friend while walking down the street.	_____	_____
4. Talk to a family member on the phone.	_____	_____
5. Talk with your clinician while standing in line for a movie.	_____	_____
6. Talk to a fellow worker that you meet in a store.	_____	_____
7. Call up a friend on the phone.	_____	_____
8. Order food at McDonald's when there are no other customers.	_____	_____
9. Talk with your physician in a store.	_____	_____
10. Answer the phone at home.	_____	_____
11. Talk with a fellow worker at work.	_____	_____
12. Ask a friend to drive you to the airport.	_____	_____
13. Talk to a telephone operator on the phone.	_____	_____
14. Introduce two friends at a shopping mall.	_____	_____
15. Talk with your boss at a social gathering.	_____	_____
16. Ask a policeman for directions.	_____	_____
17. Call a member of the opposite sex on the phone.	_____	_____
18. Talk to a group of friends in a noisy bar or restaurant.	_____	_____

Appendix B, continued

19. Talk with your instructor after class.	____	____
20. Make a long distance phone call.	____	____
21. Tell a joke in front of five people.	____	____
22. Answer questions during a group discussion.	____	____
23. Call the information operator on the phone.	____	____
24. Approach your boss and initiate a conversation at work.	____	____
25. Initiate a conversation with a stranger of the opposite sex at a party.	____	____
26. Answer the phone in a crowded room.	____	____
27. Ask questions during a group discussion.	____	____
28. Order food from your car through a speaker at McDonald's.	____	____
29. Make a phone call to say that you will be late.	____	____
30. Introduce yourself to a stranger.	____	____
31. Order a drink from a bartender at a noisy, crowded bar.	____	____
32. Talk to your boss on the phone.	____	____
33. Get in a long line at McDonald's to order food.	____	____
34. Request help in a crowded department store when all the salespeople seem busy.	____	____
35. Telephone your clinician to cancel a therapy session.	____	____
36. Introduce yourself to a group of strangers.	____	____
37. Volunteer to present a talk on your work or hobby to a group of 20 school-age children.	____	____
38. Talk to your boss at work about a work-related error that you have made.	____	____
39. Ask for directions over the phone.	____	____
40. Order food in a restaurant when the waitress is obviously in a hurry.	____	____
41. Initiate a conversation with the person sitting next to you on an airplane.	____	____

Appendix B, continued

42. Give an important 30-minute presentation at work or school.	____	____
43. Volunteer to present a talk on your work or hobby to a group of 25 adults.	____	____
44. Order a pizza over the phone.	____	____
45. Ask for a raise at work.	____	____
46. Complain about the lack of service to your waiter/waitress.	____	____
47. Call a stranger on the phone to tell him or her about a meeting.	____	____
48. Volunteer to go on a T.V. or radio talk show.	____	____
49. Order exactly what you want in a restaurant even though you might stutter on the words.	____	____
50. Call up the telephone company to question a bill.	____	____

Appendix B, continued

FLUENCY PERFORMANCE

For the second set of 50 questions ask yourself whether or not you could achieve fluent speech in each situation. Please define fluency as speech that would be so fluent in a given situation that, in your opinion, a listener would not recognize that you had a history of stuttering. Again, under the column marked CAN DO, place a check if you believe you could achieve fluency in that situation. Then mark in the column CONFIDENCE, how confident you are that you could achieve fluency. Please make these judgements honestly with respect to your present ability and not according to how you would like to perform or think that you should perform. Rate your degree of confidence by recording one of the following numbers from 10 to 100 using the scale below. If you do not believe that you can achieve fluent speech in a given situation, do not mark that item.

10	20	30	40	50	60	70	80	90	100
QUITE UNCERTAIN				MODERATELY CERTAIN					VERY CERTAIN

If you are sure that you understand the task, please complete the following list of 50 situations by (1) indicating whether you feel you could achieve your fluency level in each situation and (2) your confidence in that belief.
COULD YOU ACHIEVE YOUR FLUENCT LEVEL WHILE...

COULD YOU...	CAN DO	CONFIDENCE
1. Talk with a family member during a meal.	_____	_____
2. Request help in an uncrowded department store.	_____	_____
3. Talk to a close friend while walking down the street.	_____	_____
4. Talk to a family member on the phone.	_____	_____
5. Talk with your clinician while standing in line for a movie.	_____	_____
6. Talk to a fellow worker that you meet in a store.	_____	_____
7. Call up a friend on the phone.	_____	_____
8. Order food at McDonald's when there are no other customers.	_____	_____
9. Talk with your physician in a store.	_____	_____
10. Answer the phone at home.	_____	_____
11. Talk with a fellow worker at work.	_____	_____
12. Ask a friend to drive you to the airport.	_____	_____
13. Talk to a telephone operator on the phone.	_____	_____

Appendix B, continued

14. Introduce two friends at a shopping mall. ____ ____
15. Talk with your boss at a social gathering. ____ ____
16. Ask a policeman for directions. ____ ____
17. Call a member of the opposite sex on the phone. ____ ____
18. Talk to a group of friends in a noisy bar or restaurant. ____ ____
19. Talk with your instructor after class. ____ ____
20. Make a long distance phone call. ____ ____
21. Tell a joke in front of five people. ____ ____
22. Answer questions during a group discussion. ____ ____
23. Call the information operator on the phone. ____ ____
24. Approach your boss and initiate a conversation at work. ____ ____
25. Initiate a conversation with a stranger of the opposite sex at a party. ____ ____
26. Answer the phone in a crowded room. ____ ____
27. Ask questions during a group discussion. ____ ____
28. Order food from your car through a speaker at McDonald's. ____ ____
29. Make a phone call to say that you will be late. ____ ____
30. Introduce yourself to a stranger. ____ ____
31. Order a drink from a bartender at a noisy, crowded bar. ____ ____
32. Talk to your boss on the phone. ____ ____
33. Get in a long line at McDonald's to order food. ____ ____
34. Request help in a crowded department store when all the salespeople seem busy. ____ ____
35. Telephone your clinician to cancel a therapy session. ____ ____
36. Introduce yourself to a group of strangers. ____ ____
37. Volunteer to present a talk on your work or hobby to a group of 20 school-age children. ____ ____
38. Talk to your boss at work about a work-related error that you have made. ____ ____

Appendix B, continued

39. Ask for directions over the phone. ____ ____
40. Order food in a restaurant when the waitress is obviously in a hurry. ____ ____
41. Initiate a conversation with the person sitting next to you on an airplane. ____ ____
42. Give an important 30-minute presentation at work or school. ____ ____
43. Volunteer to present a talk on your work or hobby to a group of 25 adults. ____ ____
44. Order a pizza over the phone. ____ ____
45. Ask for a raise at work. ____ ____
46. Complain about the lack of service to your waiter/waitress. ____ ____
47. Call a stranger on the phone to tell him or her about a meeting. ____ ____
48. Volunteer to go on a T.V. or radio talk show. ____ ____
49. Order exactly what you want in a restaurant even though you might stutter on the words. ____ ____
50. Call up the telephone company to question a bill. ____ ____

Appendix C
Self-Efficacy for Adolescents Scale
(SEA-Scale)
Manning (1994)

Name_____ Date_____
Date of Birth_____ Gender_____

INSTRUCTIONS

You are asked to consider a list of 100 speaking situations. Even though you may not typically find yourself in some of these situations, indicate how confident you are about entering into and speaking in each situation by placing one of the following numbers after each situation.

1 2	3 4	5 6	7 8	9 10
No Way, I would be too too uptight to speak	I would be very uncomfortable speaking	Unsure	I would be somewhat comfortable speaking	No Problem, I would be confident speaking

EXAMPLE:

SITUATION	CONFIDENCE
1. Lift a 5 pound box above your head.	10
2. Lift a 15 pound box above your head.	9
3. Lift a 25 pound box above your head.	7
4. Lift a 40 pound box above your head.	6
5. Lift a 50 pound box above your head.	1
6. Lift an 80 pound box above your head.	___

Please complete the following practice items:

PRACTICE:

SITUATION	CONFIDENCE
1. Jump over a fence 1 foot high.	___
2. Jump over a fence 2 feet high.	___
3. Jump over a fence 3 feet high.	___
4. Jump over a fence 4 feet high.	___
5. Jump over a fence 5 feet high.	___
6. Jump over a fence 6 feet high.	___

Appendix C, continued

If you are sure that you understand what you are to do, please respond to the following 100 speaking situations by indicating your degree of confidence in your ability to enter into and speak in that situation. When ranking your confidence use a number from 1 to 10. If you do not feel that you can do a particular speaking task, do not enter a number.

SITUATION	CONFIDENCE
1. Talking with a parent about a movie you recently saw together.	____
2. Talking to a brother or sister at the dinner table.	____
3. Talking with a brother or sister about what TV program you would like to watch.	____
4. Talking with three friends your own age, during lunch at school, about a movie.	____
5. Asking a friend to come to your house after school.	____
6. Asking a parent if a friend can spend the night at your house.	____
7. Arguing with a brother or sister.	____
8. Asking a parent if you can spend the night at a friend's house.	____
9. Asking a friend to help you with your homework after school.	____
10. Talking with a group of friends as you have lunch at school.	____
11. Talking about your homework to the people who go with you to school.	____
12. Asking a parent for permission to study with a friend.	____
13. Asking a parent for permission to go see a movie with friends.	____
14. Asking a friend to come to your birthday party.	____
15. Talking with three friends at school about a new student in your class.	____
16. Talking with a group of classmates during a meeting at school.	____
17. Telling a new friend the names and ages of your brothers or sisters.	____
18. Giving your locker number to a teacher.	____
19. Telling a parent that you do not deserve to be grounded.	____
20. Giving your place and date of birth to an official of your school.	____
21. Calling your best friend on the telephone just to talk.	____
22. Asking a parent for permission to stay out one hour later than usual.	____
23. Telling your teacher at school your name and address.	____

Appendix C, continued

24. Talking with a grandparent on the telephone. ____
25. Explaining how to play a new game to a group of friends. ____
26. Talking with two new people in your class who just began attending your school. ____
27. Talking on the telephone with a classmate about your homework assignment. ____
28. Telling your parents the allowance you are given is not enough. ____
29. Asking a librarian for help in finding a book. ____
30. Asking a sales clerk about the cost of an item in a store. ____
31. Telling a police officer your home address. ____
32. Telling one of your classmates that he or she picked up your pencil by mistake. ____
33. Asking a sales clerk if a particular item is in stock. ____
34. Calling a store clerk to see what time the store opens. ____
35. Arguing with a friend about who gets to go first in a game. ____
36. Calling a theater to see when a movie starts. ____
37. Talking to other students at a new school. ____
38. Talking on the telephone with relatives who live in another city. ____
39. Arguing with a friend about who gets the last piece of candy. ____
40. Arguing with two friends about which movie you should see. ____
41. Taking a telephone message for a brother or sister. ____
42. Talking with a group of four new students in your class the first week of school. ____
43. Arguing with another student because you let a friend cut in line in front of you. ____
44. Telling a parent that you have to stay after school because you were disruptive in class. ____
45. Asking a stranger where the nearest telephone is located. ____
46. Confronting someone who cuts in front of you in line. ____
47. Raising your hand and asking your teacher for permission to leave the room. ____
48. Arguing with an older, larger, friend about who gets the last coke. ____

Appendix C, continued

49. Arguing with a friend about a boy/girl that you both like. ____
50. Answering a question in class. ____
51. Asking a question in class. ____
52. Raising your hand in order to give an answer before the teacher calls on someone else. ____
53. Telling the teacher you were not the one who was talking in class. ____
54. Introducing yourself to a group of new students at your school. ____
55. Asking someone in a group of five people the correct time. ____
56. Asking a coach of a sports team at school how to join the team. ____
57. Beginning a conversation with a group of three strangers at a party. ____
58. Going to a fast food restaurant with your family and ordering a sandwich. ____
59. Introducing yourself to a group of five students at a new school. ____
60. Telling a parent that you just broke your neighbor's window with a ball. ____
61. Accusing a friend because you believe he or she copied your homework. ____
62. Asking a stranger for directions to get to a restaurant. ____
63. Taking your turn ordering when you are having dinner in a restaurant with your family. ____
64. Telling a group of friends that you will not smoke with them. ____
65. Telling your teacher you do not understand an assignment. ____
66. Talking on the phone with a teacher about attending a class party. ____
67. Answering the telephone at a friend's house. ____
68. Telling a friend that he or she tore a pair of jeans they borrowed from you. ____
69. Asking for directions from someone who is in a hurry. ____
70. Telling an usher at a movie theatre that you are old enough to see a particular movie. ____
71. Asking your classroom teacher to move your desk to the front of the classroom. ____
72. Talking on the telephone with a classmate of the opposite sex. ____
73. Questioning a teacher about letting the same student always be first in line. ____

Appendix C, continued

74. Telling a parent about a bad report card. ____
75. Introducing yourself to a new teacher. ____
76. Talking to a teacher about something that is bothering you. ____
77. Going to a party when the only person you know is the one giving the party. ____
78. Explaining to a teacher why you are late to class. ____
79. Giving directions to a group of adults who are driving by your home in a car. ____
80. Explaining to a teacher why you were absent from school. ____
81. Asking an adult if this is the house where your friend lives. ____
82. Ordering something at a fast food restaurant when they are very busy. ____
83. Telling a joke to a group of friends at a party. ____
84. Leaving a message on someone's telephone answering machine. ____
85. Walking door to door and asking unfamiliar neighbors to buy items you are selling. ____
86. Reading aloud to a group of seven classmates. ____
87. Explaining to the school principal why you are in the hall during a class. ____
88. Asking a girl/boy to dance at a school party. ____
89. Taking part in a spelling contest. ____
90. Explaining to your school principal why you were sent to the school office. ____
91. Reading a paragraph from a book to the people in your class at school. ____
92. Introducing a speaker to a club or religious group. ____
93. Asking a person in your school to go with you to a school dance. ____
94. Giving a book report in front of the class. ____
95. Reading aloud to a group of seven adults. ____
96. Reciting a poem in your English class. ____
97. Being videotaped when giving a report to your history class. ____
98. Taking a speaking part in a school play. ____
99. Making a five-minute speech in a school assembly. ____
100. Reading an announcement to everyone in your school over the intercom. ____

OVERALL AVERAGE ____

FOR CLINIC USE
S _____
A _____ T _____
E _____

Appendix D

Perceptions of Stuttering Inventory (PSI)

Name: _____
Address: _____
Date: _____

Directions

Here are sixty statements about stuttering. Some of these may be characteristic of your stuttering. Read each item carefully and respond as in the example below.

Characteristic of me:
☐ Repeating sounds.

Put a check mark (√) under **characteristic of me** if "repeating sounds" is part of your stuttering; if it's **not characteristic**, leave the box blank.

Characteristic of me refers only to what you do **now**, not to what was true of your stuttering in the past and which you no longer do; and not what you think you should or should not be doing. Even if the behaviour described occurs only occasionally or only in some speaking situations, if you regard it as characteristic of your stuttering, check the box under **characteristic of me**. Be accurate in your judgments.

Characteristic of me:

☐ 1. Avoiding talking to people in authority (e.g., a teacher, employer, or clergyman).
☐ 2. Feeling that interruptions in your speech (e.g., pauses, hesitations, or repetitions) will lead to stuttering.
☐ 3. Making the pitch of your voice higher or lower when you expect to get "stuck" on words.
☐ 4. Having extra and unnecessary facial movements (e.g., flaring your nostrils during speech attempts).
☐ 5. Using gestures as a substitute for speaking (e.g., nodding your head instead of saying "yes" or smiling to acknowledge a greeting).
☐ 6. Avoiding asking for information (e.g., asking for directions or inquiring about a train schedule).
☐ 7. Whispering words to yourself before saying them or practicing what you are planning to say long before you speak.
☐ 8. Choosing a job or hobby because little speaking would be required.
☐ 9. Adding an extra and unnecessary sound, word, or phrase to your speech (e.g., "uh", "well," or "let me see") to help yourself get started.
☐ 10. Replying briefly using the fewest words possible.
☐ 11. Making sudden jerky or forceful movements with your head, arms or body during speech attempts (e.g., clenching your fist, jerking your head to one side).
☐ 12. Repeating a sound or word with effort.
☐ 13. Acting in a manner intended to keep you out of a conversation or discussion (e.g., being a good listener, pretending not to hear what was said, acting bored, or pretending to be in deep thought).
☐ 14. Avoiding making a purchase (e.g., going into a store or buying stamps in the post office).
☐ 15. Breathing noisily or with great effort while trying to speak.
☐ 16. Making your voice louder or softer when stuttering is expected.
☐ 17. Prolonging a sound or word (e.g., m-m-m-m-my) while trying to push it out.
☐ 18. Helping yourself to get started talking by laughing, coughing, clearing your throat, gesturing, or some other body activity or movement.
☐ 19. Having general body tension during speech attempts (e.g., shaking, trembling, or feeling "knotted up" inside).

Appendix D, continued

☐ 20. Paying particular attention to what you are going to say (e.g., the length of a word, or the position of a word in a sentence).
☐ 21. Feeling your face getting warm and red (as if you are blushing), as you are struggling to speak.

☐ 22. Saying words or phrases with force or effort.
☐ 23. Repeating a word or phrase preceding the word on which stuttering is expected.
☐ 24. Speaking so that no word or sound stands out (e.g., speaking in a singsong voice or in a monotone).
☐ 25. Avoiding making new acquaintances (e.g., not visiting with friends, not dating, or not joining social, civic, or church groups).
☐ 26. Making unusual noises with your teeth during speech attempts (e.g., grinding or clicking your teeth).
☐ 27. Avoiding introducing yourself, giving your name, or making introductions.
☐ 28. Expecting that certain sounds, letters, or words are going to be particularly "hard" to say (e.g., words beginning with the letter "s").
☐ 29. Giving excuses to avoid talking (e.g., pretending to be tired or pretending lack of interest in a topic).
☐ 30. "Running out of breath" while speaking.
☐ 31. Forcing out sounds.
☐ 32. Feeling that your fluent periods are unusual, that they cannot last, and that sooner or later you will stutter.
☐ 33. Concentrating on relaxing or not being tense before speaking.
☐ 34. Substituting a different word or phrase for the one you had intended to say.
☐ 35. Prolonging or emphasizing the sound preceding the one on which stuttering is expected.
☐ 36. Avoiding speaking before an audience.
☐ 37. Straining to talk without being able to make a sound.
☐ 38. Coordinating or timing your speech with a rhythmic movement (e.g., tapping your foot or swinging your arm).
☐ 39. Rearranging what you had planned to say to avoid a "hard" sound or word.
☐ 40. "Putting on an act" when speaking (e.g., adopting an attitude of confidence or pretending to be angry).
☐ 41. Avoiding the use of the telephone.
☐ 42. Making forceful and strained movements with your lips, tongue, jaw, or throat (e.g., moving your jaw in an uncoordinated manner).
☐ 43. Omitting a word, part of a word, or a phrase which you had planned to say (e.g., words with certain sounds or letters).
☐ 44. Making "uncontrollable" sounds while struggling to say a word.
☐ 45. Adopting a foreign accent, assuming a regional dialect, or imitating another person's speech.
☐ 46. Perspiring much more than usual while speaking (e.g., feeling the palms of your hands getting clammy).
☐ 47. Postponing speaking for a short time until certain you can be fluent (e.g., pausing before "hard" words).
☐ 48. Having extra and unnecessary eye movements while speaking (e.g., blinking your eyes or shutting your eyes tightly).
☐ 49. Breathing forcefully while struggling to speak.
☐ 50. Avoiding talking to others of your own age group (your own or the opposite sex).
☐ 51. Giving up the speech attempts completely after getting "stuck" or if stuttering is anticipated.
☐ 52. Straining the muscles of your chest or abdomen during speech attempts.
☐ 53. Wondering whether you will stutter or how you will speak if you do stutter.
☐ 54. Holding your lips, tongue, or jaw in a rigid position before speaking or when getting "stuck" on a word.
☐ 55. Avoiding talking to one or both of your parents.
☐ 56. Having another person speak for you in a difficult situation (e.g., having someone make a telephone call for your or order for you in a restaurant).
☐ 57. Holding your breath before speaking.
☐ 58. Saying words slowly or rapidly preceding the word on which stuttering is expected.

Appendix D, continued

☐ 59. Concentrating on how you are going to speak (e.g., thinking about where to put your tongue or how to breathe).
☐ 60. Using your stuttering as the reason to avoid a speaking activity.

We thank Professor Gerald Woolf, Department of Communications Disorders, Montclair State College, Upper Montclair, New Jersey, and the *British Journal of Disorders of Communication* for permission to reprint the Perceptions of Stuttering Inventory which appeared in Woolf, G., The assessment of stuttering as struggle, avoidance and expectancy. *British Journal of Disorders of Communication*, 1967, 2, 158-177.

The Perceptions of Stuttering Inventory is published by:
Communications Development Corporation, Ltd.
P.O. Box 9684
Roanoke, Virginia 24020

Appendix E
Revised Communication Attitude Inventory (S24)
S-24

CLINICAL FORM 10
REVISED COMMUNICATION ATTITUDE INVENTORY*

Please Circle the Best Answer:

1. I usually feel that I am making a favourable impression when I talk.	True	False
2. I find it easy to talk with almost anyone.	True	False
3. I find it very easy to look at my audience while speaking to a group.	True	False
4. A person who is my teacher or my boss is hard to talk to.	True	False
5. Even the idea of giving a talk in public makes me afraid.	True	False
6. Some words are harder than others for me to say.	True	False
7. I forget all about myself shortly after I begin to give a speech.	True	False
8. I am a good mixer.	True	False
9. People sometimes seem uncomfortable when I am talking to them.	True	False
10. I dislike introducing one person to another.	True	False
11. I often ask questions in group discussions.	True	False
12. I find it easy to keep control of my voice when speaking.	True	False
13. I do not mind speaking before a group.	True	False
14. I do not talk well enough to do the kind of work I'd really like to do.	True	False
15. My speaking voice is rather pleasant and easy to listen to.	True	False
16. I am sometimes embarrassed by the way I talk.	True	False
17. I face most speaking situations with complete confidence.	True	False
18. There are few people I can talk with easily.	True	False
19. I talk better than I write.	True	False
20. I often feel nervous while talking.	True	False
21. I find it hard to make talk when I meet new people.	True	False
22. I feel pretty confident about my speaking ability.	True	False
23. I wish that I could say things as clearly as others do.	True	False
24. Even though I knew the right answer I have often failed to give it because I was afraid to speak out.	True	False

Name: _____ Date: _____

* From Andrews, G. and Erikson, R. (1974). Stuttering therapy: The relation between changes in symptom level and attitudes. *Journal of Speech and Hearing Disorders. 39,* 312-319. Reprinted with permission.

Appendix F
Locus of Control of Behavior (LCB)
(Craig, Franklin & Andrews, 1985)

Name: _____ Date: _____

DIRECTIONS: Below are a number of statements about beliefs people hold about different topics. For every item there are a large number of people who would agree and a large number who would disagree. There are no right or wrong answers. Please indicate in the appropriate space the number from the scale below that most accurately describes your level of agreement with each statement.

0	1	2	3	4	5
Strongly disagree	**Generally disagree**	**Somewhat disagree**	**Somewhat agree**	**Generally agree**	**Strongly agree**

_____ 1. I can anticipate difficulties and take action to avoid them.

_____ 2. A great deal of what happens to me is probably just a matter of chance.

_____ 3. Everyone knows that luck or chance determines one's future.

_____ 4. I can control my problem(s) only if I have outside support.

_____ 5. When I make plans, I am almost certain that I can make them work.

_____ 6. My problem(s) will dominate me all my life.

_____ 7. My mistakes and problems are my responsibility to deal with.

_____ 8. Becoming a success is a matter of hard work; luck has little or nothing to do with it.

_____ 9. My life is controlled by outside actions and events.

_____ 10. People are victims of circumstances beyond their control.

_____ 11. To continually manage my problems I need professional help.

_____ 12. When I am under stress, the tightness of my muscles is due to things outside my control.

_____ 13. I believe a person can really be the master of his fate.

_____ 14. It is impossible to control my irregular and fast breathing when I am having difficulties.

Appendix F, continued

_____ 15. I don't understand why my problem(s) varies so much from one occasion to the next.

_____ 16. I am confident of being able to deal successfully with future problems.

_____ 17. In my case maintaining control over my problem(s) is due mostly to luck.

Appendix G
Information for Participants

Project title:
The effectiveness of video self-modeling (VSM) as a fluency maintenance strategy for adults and adolescents who stutter.

Principal Investigators:
Deborah Kully, MS, R.SLP, Institute for Stuttering Treatment and Research (ISTAR). Phone number: (780) 492-2619
Paul Hagler, PhD, Department of Speech-Language Pathology and Audiology, University of Alberta. Phone number: (780) 492-9674

Co-Investigator: Robin Changarathil, Graduate Student, Department of Speech-Language Pathology, University of Alberta. Phone number: (780) 233-6125

Purpose
The purpose of this study is to find out if watching a video of yourself using fluency skills in a variety of situations can help you maintain your fluent speech after therapy.

Procedures
In this study there will be two groups, Group A and Group B. If you participate in this study, you will be in one of these groups. If you are in Group A, you will receive a video about two weeks after finishing ISTAR. If you are in Group B, you will get the video 6 months later. If you participate in this study, you will have an equal chance of being in Group A or Group B.

If you are in Group A, you will watch your videotape or DVD as often as you like. You will also fill out a simple checklist that indicates when you watched the video, and how you liked it. The total time required for you to watch the video and fill out the checklist will be approximately 13 minutes, each time you view it. Every month, you will mail this checklist to ISTAR in a pre-stamped and self-addressed envelope.

Everyone in Groups A and B will be called every two months for a few minutes by the investigator to check up on how their speech has been since the ISTAR clinic. These telephone calls also will be recorded.

Six months after the ISTAR program, you will be sent some questionnaires. These questionnaires will ask about your attitudes toward speaking, your maintenance activities, and your feelings about your progress in therapy. It will take less than 1 hour to complete the questionnaires.

Risks/Benefits
We are not aware of any adverse outcomes associated with participating in this study. The possible benefits to you for participating in this study are that:

Appendix G, continued

- You may find it easier and more motivating to do your speech maintenance activities since you will receive a phone call every second month from the investigator asking about your progress.
- You will be part of a study that may contribute to our understanding of how to help people who stutter maintain the benefits of speech therapy.
- Watching the videotape/DVD may help you maintain your fluency skills. Group A participants may get this benefit soon after therapy. If you are in Group B, you may get this benefit 6 months after therapy.

Information we will use from ISTAR

We will need to use the following information from your clinic records at ISTAR:
(a) Your clinic speech samples.
(b) The questionnaires you complete before and after therapy.
(c) Your post-treatment clinic attendance information.

Participation is Voluntary

You have the right not to participate in this study, and can withdraw from this study at any time without having to give a reason and without affecting your future care at ISTAR.

Confidentiality

Your data from this study will be kept confidential. It will be stored in a locked file drawer at ISTAR by the executive director for a minimum of 5 years. Your name will not be disclosed outside ISTAR. Any research data collected about you during this study will not identify you by name, only by a coded number. Any report published or presented as a result of this study will not identify you.

After our study is complete, we may want to use the information we collected from you to answer other research questions. If we do, the University Ethics Board will check our study to make sure your data are used ethically.

Appendix H
Consent Form

Part 1 (to be completed by the Principal Investigator):

Title of Project: The effectiveness of video self-modeling (VSM) as a fluency maintenance strategy for adults and adolescents who stutter.

Principal Investigators:
Deborah Kully, MS, R.SLP,
Institute for Stuttering Treatment and Research (ISTAR)
Phone Number(s):
(780) 492-2619

Paul Hagler, PhD,
Department of Speech-Language Pathology and Audiology,
University of Alberta
(780) 492-9674

Co-Investigator:
Robin Changarathil, Graduate Student,
Department of Speech-Language Pathology
University of Alberta.
Phone Number
(780) 233-6125

Part 2 (to be completed by the research subject):

	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you have the right not to participate in this study, and that you are free to withdraw from the study at any time, without having to give a reason and without affecting your future care at ISTAR?	☐	☐
Has the issue of confidentiality been explained to you?	☐	☐
Do you understand who will have access to the information gathered for this study, including personally identifiable clinic speech samples and questionnaires?	☐	☐
Do you want the investigator(s) to inform your family doctor that you are participating in this research study? If so, give his/her name _____	☐	☐

Who explained this study to you? _____

If you have any specific questions about your rights as a participant, please contact the *Health Research Ethics Board* at 492-0302.

I agree to take part in this study: YES ☐ NO ☐

Signature of Research Subject _____

(Printed Name) _____

Date: _____

Signature of Witness _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Investigator or Designee _____ Date _____

Appendix I
Information Sheet and Assent Form

Title of Research Study *The effectiveness of video self-modeling (VSM) as a fluency maintenance strategy for adults and adolescents who stutter.*

Principal Investigators:
Deborah Kully, MS, R.SLP, Institute for Stuttering Treatment and Research (ISTAR). Phone number: (780) 492-2619
Paul Hagler, PhD, Department of Speech-Language Pathology and Audiology, University of Alberta. Phone number: (780) 492-9674

Co-Investigator:
Robin Changarathil, Graduate Student, Department of Speech-Language Pathology, University of Alberta. Phone number: (780) 233-6125

Purpose
The purpose of this study is to find out if watching a video of yourself using fluency skills can help you maintain your fluent speech after therapy

What will you have to do?:
If you and your parents agree to take part, we will ask you to go to group A or group B. People in group A will receive a video in about two weeks. People in-group B will receive a video in 6 months if they want. This video will show you speaking in situations at ISTAR. We don't know what group you will be in yet.

People in group A can watch their video at home as much as they like. People in group B can do this in 6 months if they want. People in group A will try to pay attention to their fluency skills when they watch their video. They will also fill out a form to let us know how much they watch their tape and how much they like it. They will mail their form to ISTAR every month. People in group A and group B will get a phone call from ISTAR every two months to check how they are doing. We record your phone call, if it is okay with your parents.

In 6 months we will ask you to fill out some forms about how you feel about your speech. You will send these forms to ISTAR.

Will it help?
This may help you continue your speaking progress at ISTAR by watching the videotape/DVD.
This may make it easy for you to do your speech activities from ISTAR because we will call you every two months to check your speech progress.

Will it hurt?
No, it will not hurt.

Can you quit?: Yes. You don't have to take part in the study at all, and you can quit at any time. No one will be mad at you if you decide you don't want to do this, or if you decide to stop part way through. You should tell your parents that you want to quit.

Who will know?: No one except your parents, the directors and researchers at ISTAR, and the investigators will know you're taking part in the study unless you want to tell them. Your name and your information won't be seen by anyone except your parents, the directors and researchers

Appendix I, continued

at ISTAR, and the investigators. Your information will be stored in a locked file drawer by the executive director of ISTAR for a minimum of 5 years.

Your signature: We would like you to sign this form to show that you agree to take part. Your mom or dad will be asked to sign another form agreeing for you to take part in the study.

Do you have more questions? You can ask your mom or dad about anything you don't understand. You and your parents can also talk to the *Health Research Ethics Board*. Their phone number is 492-0302.

If you want to take part in this study, please sign your name below:

I agree to take part in the study:

_____	_____
<signature of research participant>	<date>
_____	_____
<signature of witness>	<date>
_____	_____
<signature of investigator>	<date>

Appendix J

PARENT CONSENT FORM

Title of Project:

Principal Investigators:
Deborah Kully, MS, R.SLP, Institute for Stuttering Treatment and Research (ISTAR). Phone number: (780) 492-2619
Paul Hagler, PhD, Department of Speech-Language Pathology and Audiology, University of Alberta. Phone number: (780) 492-9674

Co-Investigator: Robin Changarathil, Graduate Student, Department of Speech-Language Pathology, University of Alberta. Phone number: (780) 233-6125

Part 2 (to be completed by the research subject):

	Yes	No
Do you understand that your child has been asked to participate in a research study?	☐	☐
Have you read and received a copy of the attached Information Sheet?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that your child has the right not to participate in this study, and that you are free to withdraw your child from the study at any time, without having to give a reason and without affecting your child's future care at ISTAR?	☐	☐
Do you understand who will have access to your child's records, including personally identifiable clinic speech samples and questionnaires?	☐	☐
Do you want the investigator(s) to inform your child's family doctor or pediatrician that your child is participating in this research study? Doctor's name _____	☐	☐

Who explained this study to you? _____

If you have any specific questions about your child's rights as a participant, please contact the *Health Research Ethics Board* at 492-0302.

Child's Name _____

I agree for my child to take part in this study: YES ☐ NO ☐

Signature of Parent or Guardian _____ Date & Time _____

(Printed Name) _____

Signature of Witness _____ Date & Time _____

Signature of Investigator or Designee _____ Date & Time _____

THE INFORMATION SHEET MUST BE ATTACHED TO THIS CONSENT FORM AND A COPY GIVEN TO THE RESEARCH SUBJECT

Appendix K
Interview Inquiring About Previous Speech Therapy

Participants in both groups will be briefly interviewed to learn about any previous speech therapy programs attended. The content of the interview questions are indicated in the script below. The exact form of the interview questions may vary, depending on the responses given.

1. Have you ever had any kind of speech therapy?

If client has received previous therapy, then the following questions will be asked:

2. When did you receive it?

3. How long was the therapy?

4. What type of therapy did you receive?

5. What kinds of things did you do in therapy?

6. How did the therapy help you?

Appendix L
Consent Form for Phone Call Sampling

Institute for Stuttering Treatment and Research
Faculty of Rehabilitation Medicine

AUTHORIZATION FOR RELEASE OF INFORMATION FROM PHONE CALL SAMPLING

I understand that in order to obtain valid measures of my post-clinic speech it is necessary to have samples of my speech from my home and work environments. I also understand that such samples might be obtained through unexpected phone calls that would be recorded for subsequent analysis.

I hereby authorize the Institute for Stuttering Treatment and Research to obtain samples of my speech through recorded phone calls. I understand the information will remain confidential and will be released only to physicians and authorized speech pathologists and may be published anonymously in scientific reports.

I further understand that I have the right to withdraw my consent for the release of information and recordings at any time without jeopardizing my relationship with the Institute for Stuttering Treatment and Research in any way.

_____ _____

(Client's signature, or parent or guardian if client is under 18) Date

_____ _____

Witness Date

Appendix M
Letter sent to the VSM group one week after the ISTAR program

Date:

Dear _____:

Thank you for agreeing to participate in our study. I hope things have been going well since you completed the clinic.

As we discussed at the end of the ISTAR clinic, we are doing a study on strategies to help people maintain fluency after treatment.

This study investigates how watching oneself speak fluently on video (VSM) can help in maintaining fluency after therapy. Thank you for being willing to participate in the VSM program. It is our hope that the VSM program proves to be of significant benefit to you.

Your post-treatment speech samples are included in the enclosed video.

Please follow these steps:

1. Watch the tape as often as you wish. However, we *strongly* recommend that you watch the tape **at least once a week**. ***
2. Pay particular attention to your fluency skills while you watch the tape.
3. Fill out the ***viewing log*** (included in this package) after every viewing.
4. At the end of each viewing log period, complete the ***video sample rating form*** (attached to the viewing log).
5. Mail both the viewing log and video sample rating form back to ISTAR, using the pre-stamped, self-addressed envelope (included in this package).

*** We have found some evidence in the literature that watching a VSM tape **at least once a week** can significantly benefit one's fluency.

Thank you very much for your cooperation!

Best regards,

_____

Robin Changarathil,
Graduate Student, Department of Speech-Language Pathology, University of Alberta.

Appendix N
Letter sent to VSM and TAU groups one week after the ISTAR program

Date:

Dear _____:

We hope things have been going well for you since your intensive clinic at ISTAR. In this note, we would like to remind you to continue the progress you made during clinic by doing maintenance activities. As you know, there are several exercises that are involved in maintaining fluency. Some of them are mentioned here:

- daily 'warm-ups' (5 to10 minutes)
- ongoing fluency skill practice
- transfer exercises,
- cognitive behavioral exercises from the *Facilitating Fluency* manual.
- refresher clinics
- joining or forming self-help groups
- other activities to work on your speech. For example, joining clubs (e.g. Toastmasters), doing volunteer work, etc.

We hope that you will be able to incorporate these activities in your daily schedule in order to maximize the progress made during clinic.

Please contact ISTAR (492-2619; istar@ualberta.ca) if you have any questions.

All the best,

_____

Appendix O

Viewing Log

Each time you view your speech samples:

- **Circle the date, and**
- **Check (√) the segments that you watched in the appropriate box**
  - **If you watch a segment more than once, put more than one checkmark.**
  - **For examples, see the first four entries on the viewing log below**

Viewing Log – February March					
Date	**Reading sample**	**Conversation sample**	**Public speech**	**Phone sample**	
EXAMPLE					
1-Feb	√	√	√	√	**(if you watched each segment one time)**
2-Feb					**(if you did *not* watch the video)**
3Feb					**(if you did *not* watch the video)**
4-Feb	√	√√√	√√	√	**(if you watched reading 1 time; conversation 3 times;; public speech twice; phone once)**
Start here					
10-Feb					
11-Feb					
12-Feb					
13-Feb					
14-Feb					
15-Feb					
16-Feb					
17-Feb					
18-Feb					
19-Feb					
20-Feb					
21-Feb					
22-Feb					
23-Feb					
24-Feb					
25-Feb					
26-Feb					
27-Feb					
28-Feb					
01-Mar					
02-Mar					
03-Mar					
04-Mar					
05-Mar					
06-Mar					
07-Mar					
08-Mar					
09-Mar					
10-Mar					

Note: After viewing your samples for the time period of February 10- March 10, please complete the attached ***video sample rating form*** **(following page)**. Then, return the log (this page) and the speech sample rating form in the pre-addressed, stamped envelope provided.

Appendix P
Video Sample Rating Form

Name: _____ Date: _____

Please complete this form after viewing your samples for the month of XXX

Circle the choice that indicates the extent to which you agree with each of the following statements. Circle one choice for each number.

1. I liked the way I sounded when **reading** to a stranger.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

2. I sounded natural when **reading** to a stranger.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

3. I liked the way I sounded in my **conversation** with a stranger.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

4. I sounded natural in my **conversation** with a stranger.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

5. I liked the way I sounded in my **public speech**.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

6. I sounded natural in my **public speech**.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

7. I liked the way I sounded in my **phone conversation**.

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

8. I sounded natural in my **phone conversation**

Strongly Agree	Agree	Not Sure	Disagree	Strongly disagree

Table 1. Percentage of Stuttering in Telephone Samples from Participants in the VSM and TAU Groups Pre-Treatment; Immediately Post-Treatment; and 2, 4, And 6 Months Post-Treatment.

Participant	Pre	Post	2mos.	4mos.	6mos.
		VSM			
1	8	0	1	1	1
2	13	0	0	0	2
3	2	0	0	3	4
4	10	0	2.8	5.9	3.9
5	22	0	0	0.6	0.8
6	14.9	4	4.5	1.6	13.8
$\bar{X}$ (N=6)	11.7	0.7	1.4	2.0	4.3
		TAU			
7	20	13	5	10	13
8	7	7	8	12	10
9	6	0	3.2	2.7	7.4
10	9	5	0.4	0.2	1.1
11	18	9	4.1	4.8	10.1
$\bar{X}$ (N=5)	12	6.8	4.1	5.9	8.3
$\bar{X}$ (N=11)	11.8	3.5	2.6	3.8	6.1

Table 2. Syllables Spoken Per Minute in Telephone Samples from Participants in the VSM and TAU Groups Pre-Treatment; Immediately Post-Treatment; and 2, 4, and 6 Months Post-Treatment.

Participant	Pre	Post	2mos.	4mos.	6mos.
		VSM			
1	127.9	244.8	173.4	209	171.6
2	133.3	224.6	257.5	189.4	219.5
3	183.8	147.2	169	174.8	156.1
4	115.9	210.5	169	206.8	180.2
5	100.9	161.8	136.2	145	168.9
6	77	110.3	52.9	81.8	55.8
$\bar{X}$ (N=6)	123.1	183.2	168.5	167.8	158.7
		TAU			
7	104.4	95.7	153.9	120.7	144.8
8	126.8	173.1	177.3	127.5	157.0
9	51.02	129.1	108.3	111.4	75.3
10	142.5	178.6	216.7	280.9	222.0
11	83.0	119	135.5	167.5	144.0
$\bar{X}$ (N=5)	101.5	139.1	158.3	161.6	148.6
$\bar{X}$ (N=11)	113.3	163.2	163.9	165.0	154.1

Table 3. Scores on the S-24, PSI, and LCB Self-Report Questionnaires Immediately Before, Immediately After, and 6 Months Following an Intensive Program

	S-24			PSI			LCB		
Subject	Pre	Post	Follow-up	Pre	Post	Follow-up	Pre	Post	Follow-up
				VSM					
1	14	3	3	20	3	6	15	8	9
2	21	6		30	12		25	8	
3	11	11	2	26	1	3	26	13	5
4	19	7		38	5		33	24	
5	14	2	4	10	0	0	20	16	20
6	23	3	12	44	10	23	6	2.5	4
				TAU					
7	20	11		44	19		34	29	
8	24	7		25	6		24	24	
9	15	7		19	2		16	5	
10	20	13	12	39	30	14	39	30	30
11	21	14		NR	7		NR	22	

Table 4. Scores on the SESAS/SEA Self-Report Questionnaire Immediately Before, Immediately After, and 6 Months Following an Intensive Program

	SESAS					
	Pre		Post		Follow-up	
Subject	Approach	Performance	Approach	Performance	Approach	Performance
			VSM			
1	73.09	NR	99	100	98	NR
2	58.82	27.8	83.8	76.7		
3	78.6	62	96.2	94.2	93	90.8
4	44.5	N/A	87	95.8		
5	93.4	44.6	98.4	95.8	98.6	85.2
6	41	12	74.3	88	72	79.7
			TAU			
7	41.2	47.2	72.2	69.3		
8	40.4	30.6	82.1	79.7		
9	52.4	40	94.4	96		
10	48.8	15.8	67.8	72.2	85.4	86.1
11	51	N/A	69.6	N/A		